

that have previously not been well patronized. Consequently, additional passenger capacity seems to exist on most Western systems. The general exception to this appears to be peak-hour service provided in Los Angeles and San Francisco. The problems associated with eastern, northeastern, and southern transit operations seem to relate to the extremely large numbers of transit-dependent riders that have dominated the operation of these services for several years. Because of these large numbers of transit-dependent riders, many services operating in communities in these parts of the country have been tailored to adequately meet those needs. However, during energy-crisis situations, the greatest increases in ridership would not come from these same well-served communities. Most probably, the greatest increases would be realized by the suburban commuter services. The 1974 gasoline-shortage experience seems to verify that conclusion.

WORKING TOWARD A SOLUTION

It can now be said that, in answer to the question posed at the beginning of this paper, current public transportation systems in the United States would not be able to adequately meet the demands imposed on it by possible future energy-crisis situations. Thus, we must look to what can be done to alleviate this problem.

Clearly, the development of an emergency energy contingency plan for every mass transit provider in the country is a necessity. All systems must be aware of the steps that can be taken to maximize use of their existing resources and to provide for the maximum number of riders possible. Fortunately, many systems across the country have already developed or are in the process of developing such plans. Hopefully, by the end of 1981, energy plans will be a standard part of the planning process of all mass transit systems.

Effective short- and long-range planning will also be a key element toward solving this potential problem. Short-range planning should be directed toward fine-tuning existing routes and schedules so as to meet existing demand in the most efficient and effective manner. Long-range planning should have the foresight to develop appropriate capital programs capable of expanding and maintaining operating fleets in a manner that will most effectively provide for additional service to meet future energy-crisis situations. Long-range plans should also include activities designed to encourage a smoother transition from the private automobile to public transportation so as to alleviate the impact of future energy shortages.

Finally, public awareness of this potential problem must be greatly enhanced. People must realize that their

traditional travel patterns and habits may well not be compatible with the availability of future resources. Therefore, an overall program to educate the public more effectively in the area of energy consciousness would appear to be a key element in lessening or ultimately sidestepping future crisis situations.

OUTLOOK FOR THE FUTURE

Despite efforts now under way by urban transit systems to plan for the inevitable problems that will arise from future energy shortages, the overall impact of these situations, nevertheless, will be quite severe and, most likely, will cause extremely difficult times for the average U.S. commuter. Decades of personalized transportation provided by the private automobile have conditioned the United States into thinking that such ease and flexibility in transportation are inalienable rights. The realization that such convenience may no longer be feasible may be difficult for the average citizen to accept. The impact can be substantially lessened, however, if the transportation alternative—represented by the mass transit systems—is substantially upgraded and expanded to an appropriate level capable of absorbing these transition riders with only a minimum of growing pains. In order to accomplish this, planning, growth, and spending must be undertaken now at an unprecedented pace.

Our confrontation with this problem may actually be much closer than anyone expects. Surely, an interruption—even for a limited time—of the petroleum supplies from the Persian Gulf could trigger an energy-related chain reaction that could confront us with the problem in a matter of weeks. Hopefully, this confrontation will materialize more gradually, over a period of several years, which may permit us to adequately prepare for this inevitable occurrence. In either case, the fact remains that public transportation in the United States is not what it used to be and certainly not what it should be. Its overall ability to respond to major energy-constraint situations is only very limited at best and, more likely, wholly inadequate.

The transportation problems experienced by visitors to the 1980 Winter Olympics in Lake Placid, New York, may well have been a sneak preview of what may be experienced on a nationwide basis not too many years from now. If the United States cannot plan or provide for transportation services any more adequately than was done by the Olympic Committee, the same inconvenient and, at times, chaotic conditions that were experienced at the Olympic games may be imposed on an equally transit-dependent U.S. citizenry. To avoid such a situation, adequate measures should have begun yesterday.

Potential Roles for Auxiliary-Paratransit Services in an Energy Shortage

Charles Carlson and Mary P. McShane

There is a variety of specialized transportation services that can and should play an important role both in energy conservation and in the nation's response to future fuel shortages. Described here as auxiliary-paratransit services, these service types include dial-a-ride (DAR), subscription bus, jitney service, shared-ride taxi (SRT), vehicle rental-lease operations, school bus service, privately owned intercity bus operations, and limousine services.

Auxiliary-paratransit services may be open to the general public or they may be restricted to certain user groups (e.g., the elderly, the handicapped, and company employees). Fares and funding approaches vary; public subsidies may or may not be used to cover operating costs.

Auxiliary-paratransit services use a variety of vehicles

that may be owned and operated by either public- or private-sector organizations (with or without union labor). These vehicles may include transit buses, over-the-road intercity coaches, school buses, taxis, vans, and regular passenger sedans and station wagons.

Finally, auxiliary-paratransit services may be subject to public regulation. Such regulation may encompass fares, service areas, routes, schedules, and market-entry requirements.

Paratransit modes have tended to be viewed as secondary services, modest in scale but with rather specialized application. The growth of paratransit has been hindered also by the existence of institutional and regulatory barriers, some of them explicitly intended to

protect conventional transit operations from competition. In the event of a major fuel emergency, however, it is virtually certain that conventional transit capacity will be heavily overburdened, even on routes that are well served in normal times. At that point, it will be necessary to seek out and press into service all available auxiliary and paratransit capacity in order to retain a tolerable level of citizen mobility. Even if an acute fuel emergency does not develop, energy prices will continue to rise and chronic supply shortages are likely to become the rule rather than the exception. When this happens, the need for additional services will be equally critical. However, the position of such services will be precarious unless they are recognized immediately as potential coping mechanisms and are given particular planning attention.

There are four primary reasons for focusing on the augmentation of such services. First, there are large numbers of auxiliary-paratransit vehicles already in operation in the United States. These vehicles include intercity coaches, school buses, minibuses, vans, and automobiles. Transit systems have limited capital available to them, and the acquisition of new equipment requires a long lead time. Few transit systems have additional vehicles on hand for emergency expansion of service. Auxiliary-paratransit vehicles, therefore, could be an extremely important resource. Particularly during a fuel shortage, these vehicles could help to absorb the excess demand for public transportation that results from reduced fuel availability for automobiles.

Second, rising fuel prices and sporadic fuel shortages will generate demands by the public for new transportation services that can help them to preserve their mobility. Auxiliary-paratransit services should form a major element of the public- and private-sector response to these demands. Under many circumstances, such services may be less expensive to operate than new fixed-route transportation services and less difficult to establish administratively.

New auxiliary-paratransit services can also be effective in encouraging permanent reductions in the nation's energy consumption. By providing people with the means to fulfill their travel needs without an automobile, auxiliary-paratransit services can discourage automobile travel. More than that, they may persuade some people to sell or not purchase a second car.

Third, fuel supplies for auxiliary-paratransit services may be threatened by fuel shortages during the next decade. If such shortages occur, localities and individual auxiliary-paratransit service operators would do well to have contingency plans ready in order to maintain current operations. Even without severe fuel shortages, existing auxiliary-paratransit services will face increasingly more difficult struggles in the coming years to maintain current levels of operation in a climate of rapid inflation, rising fuel costs, and tight government budgets. Attention needs to be directed now to the identification of methods to ensure that existing services are operated at maximum productivity during both normal and fuel-short periods.

Finally, existing private operators constitute a reservoir of expertise and experience that should not go unnoticed as the nation moves to reduce energy consumption and to prepare for sporadic energy shortages. Indeed, these operators may be essential to the creation of comprehensive and productive transportation energy conservation and contingency plans at the local level.

This paper focuses on six types of services (rental-lease vehicles, shared-ride taxi, dial-a-ride, jitney services, school buses, and intercity bus operations) that may be particularly important during future fuel shortages. The potential value of each service and obstacles to expanded operations are discussed. A number of issues that seem to be of general concern with respect to all of these service types are highlighted for special consideration in the next section. Finally, general recommendations regarding each service type are presented.

EXPANDED USE OF RENTAL-LEASE VEHICLES

It is difficult to determine with great accuracy the size of the vehicle rental-leasing industry because data are so limited. However, estimates from several sources suggest that the size of the rental-car fleet was approximately 450-490 000 cars in 1978 (1). The lease-car fleet is estimated to be nearly 10 times as large as the daily rental fleet; it numbered more than 4.2 million vehicles in 1978 (1). Both sides of the industry have traditionally experienced rapid growth, with rental-car growth averaging about 12.6 percent/year between 1964 and 1972 (2).

Both rented and leased cars are heavily used by business people. The Urban Institute's paratransit study estimated that 80 percent of the daily revenue from rental cars is for business-related travel, primarily on weekdays (2). Rental-lease cars have tended to be full-sized models with automatic transmissions and are generally held by the rental-leasing agency for 6-18 months.

Tourists also make up a large portion of the daily rental-car market in cities and recreation areas, but these persons do not figure largely in car leasing. Finally, there are several cities, notably New York, in which city residents represent a substantial fraction of the daily rental-car market because they prefer renting to owning.

Because of the needs of their customers, daily rental-car agencies are heavily concentrated near transportation terminals, downtown business districts, major travel corridors, and tourist or convention centers. Car-leasing agencies, on the other hand, are more evenly distributed throughout population centers. Some agencies, in fact, are located within suburban residential areas as part of car dealerships.

The car rental-lease industry is not regulated as a utility; instead, government has viewed the industry as a form of private enterprise and generally has left it free of any regulations except those that pertain to all private businesses.

Strategies

Four possible strategies for involving the vehicle rental-leasing industry in national energy conservation programs are proposed here for further study.

Employer Van Leasing Through Standard Car-Leasing Companies

Many employers now lease cars for their sales people, executives, and other employees. Indeed, many companies own no cars; instead, they prefer to lease vehicles as they are needed. Some of the largest companies spend more than \$1 million/year for this purpose.

Given the size and scope of the corporate vehicle-leasing business, it is quite conceivable that vans could be fully integrated into the leasing industry. Employers could lease vans and use them to establish a vanpool program. Leases could be written for several months or more than a year, depending on the desires of employers (which may be greatly affected by the state of the nation's energy supplies).

This concept would provide employers with an opportunity to try a vanpool program without making a substantial capital investment. Indeed, some companies currently involved in vanpooling started their programs by using leased vans and, subsequently, became purchasers. Many employers might be attracted to the concept because vehicle rental-lease companies are already knowledgeable about and prepared to undertake the responsibility for maintaining and insuring the vehicles. Van leasing would also enable employers to institute vanpool programs quickly in the event of a fuel shortage. If the vanpool program were successful, employers might be able to purchase the vans they had been leasing and to apply lease payments toward purchase—a practice that many car-leasing organizations follow today.

Of course, the normal financial and administrative requirements of operating a vanpool program would not disappear as a result of van leasing. State regulations vis-a-vis insurance and taxes, for example, would have to be followed. Employers would have to spend some operating funds to administer vanpooling programs and to pay for the lease cost of the vehicles. A marketing program would be needed to sell the vanpooling concept to employees.

Crucial to the success of the van-lease concept, however, would be extensive marketing efforts by vehicle rental-lease organizations. By aggressively contacting employers and publicizing existing employer van-lease programs and the benefits of the lease-purchase option, vehicle rental-lease organizations might be able to add a substantial new dimension to their businesses. Ultimately, a large commitment to vanpooling by employers could lead to a substantial and permanent reduction in the nation's consumption of energy for commutation.

Integrated Vanpool and Car-Leasing Arrangements

This idea would involve mixed leasing of vans and cars by a single group of commuters. In brief, a van would be leased by the commuter group for work-trip travel Monday through Friday. Friday night or Saturday morning, the commuter group would travel to the lease site, drop off the van, and pick up separate cars for weekend use. Alternatively, one member of the vanpool could keep the van during the weekend. The cost of the weekend rental cars would be lower than normal because of the van lease Monday through Friday. The cost of the van lease would, as usual, be shared among the commuter group members and would be at prevailing rates.

This concept appears attractive for several reasons. First, rental cars are generally easy to obtain on weekends because most use occurs Monday through Friday. Second, such a practice might eliminate a family's need for a second car to be used for commuting. Third, though it requires some analysis regarding relative costs, this practice might prove to be less expensive than individual vehicle ownership. Finally, the total vehicle miles traveled (VMT) of the commuter group would be reduced, thereby reducing both energy consumption and pollution.

Several of the largest car-rental firms have indicated that the van- and car-lease concept may be feasible and attractive to them. However, several factors can affect the implementation of such programs.

First, insurance might prove to be a problem if insurance companies determine that the van leased by a group of commuters constitutes for-hire use of the vehicle. If insurance companies did make such a determination, insurance costs would escalate substantially, with consequent increases in the cost of leasing a van.

Second, the companies noted the need to positively identify vanpoolers if weekend car rentals are to be provided to these persons at a lower-than-normal price. Membership in a formal organization that could certify participation in a vanpool would be necessary. An employer or a state agency might be an acceptable certifying agent. Membership cards that would be renewed every few months would most likely be necessary to eliminate use of low-cost rentals by persons who had dropped out of pools.

Third, it may prove necessary for the commuter group to lease the van on a weekly basis rather than on a Monday-through-Friday basis. Under a five-day lease, weekend rental of the vehicle would be impossible. Rental of the van for Saturday or Sunday would leave open the possibility that the weekend renter would keep the vehicle for an extra day or two or would return it to another outlet of the leasing company. Controlling such problems would be nearly impossible. Thus, only a seven-day lease would be feasible for the leasing company. If this is the case, one of the members of the vanpool would have to keep the van on weekends and use that vehicle (rather than a car) for personal travel.

Despite these concerns, the van- and car-lease concept

does appear to have some promise as an energy conservation device. It remains to be seen whether rental-lease vehicle companies will be willing to test the implementation of the concept.

Carpool-Vanpool Brokerage by Car Rental-Leasing Companies

Brokerage might be feasible if interest by the car rental and leasing companies was generated by the first two strategies noted above. The rental-lease company would take the lead in marketing a variety of carpool and vanpool options to employers. Such options might include (a) matching service for employees; (b) van leases for vanpools after large group matches are made; (c) car ("rabbit" pool) leases for small-group carpools that may encourage users to sell or not purchase a second commuting car; (d) van-car lease arrangements as described above; and (e) administration, maintenance, and insurance of carpools and vanpool programs.

At least two major ingredients would be required to ensure the success of such programs. Vehicle rental-lease companies would have to make a major internal commitment to these programs (i.e., staff, financial, resources, and top management involvement). In addition, these companies would have to undertake vigorous marketing programs to sell their services to employers.

State governments might be able to stimulate private-sector interest in these programs by committing a block of their ridesharing funds to rental-lease program operations. One approach would have the state establish a list of rental-lease agencies that are prepared to offer (at varying prices) some or all of the services described above. An employer would be able to contact the state for information about available services; then, employers could select one of the listed agencies to establish a high-occupancy-vehicle program to meet the specific needs of employees. The state might then contribute a portion of the cost to establish the program.

Several benefits would result from this approach. It would very likely result in an expanded number of vendors offering such services, thereby relieving state and local governments of the burden of direct provision of ridesharing, marketing, and matching activities. This increase in the number of willing vendors would also make it easier for larger numbers of employers to obtain timely professional assistance at a competitive price. Also, the approach offers flexibility in that market needs would determine the overall level of ridesharing services offered, with providers entering the market according to demand.

Ad Hoc Public Transportation by Using Rented Vehicles

During a fuel shortage, rental-lease vehicles, particularly vans, could be used in rural areas to create public transportation services, particularly if school buses are unavailable and there is no local taxi company. Such services might be sponsored (financially or otherwise) by local governments or they might be operated as private enterprises by individual entrepreneurs. The implementation of these services, however, would undoubtedly require an extensive period of time, leading to the conclusion that extensive preshortage planning would be necessary.

EXPANDED USE OF PRIVATELY OWNED INTERCITY BUSES

There are approximately 1100 private companies that provide intercity bus service in the United States (3). These companies service about 15 000 communities with a fleet of 20 200 buses—usually over-the-road coaches rather than urban transit buses (3). In 1978, intercity bus companies transported 335 million passengers, compared to 260 million for airlines, 280 million for rail, including the National

Railroad Passenger Corporation (Amtrak), and 7.6 billion for mass transit services.

Two companies—Greyhound and Trailways—dominate the industry. In 1976, they provided 56 percent of the industry's total bus miles of service, while accounting for 24 percent of the industry's total revenue passengers and 62 percent of total industry operating revenues. After Greyhound and Trailways stand 46 so-called class 1 operators whose annual gross revenues exceed \$3 million/year. There are also approximately 1000 class 2 and class 3 carriers that have annual revenues of less than \$3 million. In 1976, class 1 carriers (including Greyhound and Trailways) accounted for 75 percent of the industry's total bus miles of services, 43 percent of the total number of revenue passengers for the industry, and 77 percent of total industry operating revenues (4).

Regular-route intercity passenger operations are not the only services provided by the intercity bus industry. Indeed, other services provide a substantial portion of the industry's revenues (3)—regular-route passenger service, 50 percent; charter service, 30 percent; package express service, 15 percent; and other services, 3 percent.

The market for intercity bus services in the United States is unique among the major transportation modes. Users of intercity bus services who make trips of more than 100 miles tend to have lower incomes and more-limited educations than users of other modes. Students, members of the military, and retired persons are heavy users. Unlike any other mode, the majority of intercity bus passengers is female (5). Long-haul intercity buses are most heavily used for sightseeing, entertainment, and visiting friends and relatives. Business use of long-haul intercity bus services is relatively low. Short-haul intercity bus services have not been studied extensively. Insufficient data are available, therefore, on the market for and users of these services. It appears safe to assume, however, that commuters make up quite a substantial portion of the ridership of these services. Elderly, poor, and young persons who are dependent on public transportation probably constitute the majority of other types of riders.

Fares for intercity bus service are still low relative to those for other modes. In 1976, trips on class 1 intercity bus carriers cost an average of 5.14 cents/passenger mile. Other per passenger mile costs were Amtrak, 5.56 cents; domestic airlines, 7.63 cents; and cars, 17.9 cents (4).

Intercity buses are extremely fuel efficient. An intercity bus in scheduled route service can achieve 113 passenger miles of service/gal of fuel; the figures for trains, airplanes, and cars are 38, 22, and 41, respectively.

Labor patterns in the industry vary considerably. The vast majority of class 1 intercity bus companies is unionized; many of the smaller carriers are not. Wage and salary rates in the intercity bus industry are generally higher than those for the taxi industry, but they are usually lower than the wage and salary rates of personnel who work for railroads, mass transit enterprises, and airlines.

Intercity bus services, if they travel across state boundaries, are regulated at the federal level by the U.S. Interstate Commerce Commission (ICC). Intrastate services are regulated by state public utilities commissions (PUCs), which vary widely in their powers and activities. In general, however, the ICC and most PUCs regulate safety, fares, market entry, service characteristics, and mergers. The major difference between PUCs and the ICC is that the latter does not regulate the service frequencies of interstate carriers.

Since World War II, the services and financial condition of the intercity bus industry have been slowly deteriorating. The most pronounced decline, however, occurred during the 1970s. Competition from the private car has been the most important cause of this decline, but federal assistance to mass transit, intercity rail, airline enterprises, and human service agencies has also played a role. Finally, poor management has been cited as a source of the industry's fall from prominence. Clear evidence of the industry's problems

can be seen in the rising operating ratios (i.e., total operating expenses divided by total operating revenues times 100) for class 1 carriers. Between 1968 and 1978, the national operating ratio for these carriers rose from 88.9 to 96.0 (3). According to George Snyder of the Greyhound Corporation, the fact that Greyhound was operating with an average load factor of only 53 percent during the height of the 1979 gasoline shortage is an indication of the excess capacity that exists on intercity bus services.

Despite these problems, there have been only piecemeal moves to provide public-sector financial assistance to the intercity bus industry. Limited financial assistance theoretically is available from the federal government through DOT's Section 3 and 18 programs, although few funds have been expended for this purpose to date. (It should be noted that the Surface Transportation Assistance Act of 1978 authorized specific capital and operating assistance programs for the intercity bus industry. No funds, however, were appropriated for these programs.) In the absence of large-scale federal assistance, several states have taken action to provide funding to the industry. Michigan has the most extensive program and provides both capital (for vehicles and terminals) and operating assistance to carriers who wish to operate new or expanded services. New Jersey provides substantial amounts of operating assistance funds to private carriers who operate local and/or intercity service (most funds to date have been provided for commuter services). New York, Pennsylvania, West Virginia, Iowa, and Oregon also provide capital and/or operating subsidies, but their financial assistance programs are small compared to those of Michigan and New Jersey.

The energy crisis and related factors should stimulate other states and the federal government to pay more attention to the intercity bus industry. Short-haul intercity bus services, in particular, should be perceived as major actors in local transportation networks. They provide essential commuter and recreational transportation services in many rural areas. Intercity bus companies have vehicle, labor, management, and other resources that could be invaluable in regional responses to future fuel shortages.

Strategies and Problems

It may be feasible for intercity bus services to initiate new services designed to encourage energy conservation and to help maintain individual mobility during fuel shortages. Such services could include (a) expansion of existing services, (b) new routes linking rural and metropolitan areas, (c) new routes between suburbs and central-city areas (including park-and-ride services), (d) supplemental fixed-route transit service within cities, and (e) contract service to employers.

Increasing existing short-haul intercity bus services by reducing headway spacing would be most valuable to commuters and would relieve the strain caused by sudden influxes of peak-period demand. New routes linking rural and metropolitan areas would aid in maintaining the economic stability of rural tourist and recreation areas and could also serve to maintain personal mobility for some rural residents who do not have access to other public transportation services. Likewise, new routes between suburbs and central-city areas would provide an alternative to car travel for many users, while the use of intercity buses as supplements to fixed-route mass transit could allow excess demand on these routes to be accommodated quickly. Finally, employer-sponsored subscription or park-and-ride services provided by intercity bus companies could play a significant role in ensuring that employees can get to and from work during a shortage. If these services were introduced during times of plentiful fuel supplies, coupled with a campaign of service promotion and car disincentives, employer-sponsored bus services could make a contribution to energy conservation.

However, decisions regarding the implementation of one

or more of these services will require consideration of a variety of issues, including fuel availability, regulatory requirements, funding and fare questions, vehicle design problems, labor conflicts, and vehicle availability.

Fuel Availability

DOE's Special Rule 9 (6) provides that intercity bus operators who have bulk storage facilities and whose vehicles use diesel fuel (as virtually all intercity buses do) may acquire as much fuel as they need, whether or not a fuel shortage exists. The only problem that might arise for these operators is locating suppliers who have fuel for sale at a reasonable price (7). Carriers who cannot locate fuel must apply for fuel from state set-asides. (The state set-aside program allows states to reserve up to 4 percent of total state diesel fuel supplies. The state may distribute allotments from this reserve to fuel users who are experiencing hardship.)

At the moment, these procedures appear to be working reasonably well. However, DOE's petroleum-allocation regulations are scheduled to expire in September 1981. If these regulations are not extended, fuel supplies will henceforth be allocated only by price—a potential disaster to intercity bus operators who are constrained by limited operating funds, fixed-cost contracts, and public regulation of fares. As prices rise sharply during a shortage, some operators just may not be able to finance their fuel purchases.

Regulatory Requirements

This paper noted earlier that interstate bus services are regulated by the ICC and intrastate services by state PUCs. Implementation of new bus services or expansion of existing intrastate services will require regulatory approvals at the state or federal level. Street licenses will have to be obtained from local authorities. If the new services are to operate within any part of a transit authority's service district, the transit authority may have to approve these operations.

All of these regulatory processes will take time, particularly if the regulatory agencies are hesitant to use their emergency powers to authorize new or expanded intercity bus services. Regulatory requirements, therefore, may pose a significant obstacle to prompt expansion of intercity bus services in the event of a fuel shortage.

Funding and Fare Questions

If new bus services are introduced without public subsidy when fuel supplies are plentiful, fares are likely to be high (relative to the out-of-pocket cost of car travel) and the demand for service most likely will be low. Stimulating use of new intercity bus services in order to reduce energy consumption, therefore, may require some amount of public subsidy to reduce fares to attractive levels. Finding funding sources for such subsidies, on the other hand, may be quite difficult due to the lack of "fat" in current federal and state assistance programs.

If new intercity bus services are introduced in response to a serious fuel shortage, many members of the public may be quite willing to pay full-cost fares in order to abandon their cars. In this case, a major financial issue facing regulatory authorities will be the degree of profit that they will allow intercity bus operators to earn.

Other members of the public (e.g., elderly, handicapped, and poor persons), however, may be unable to afford the full-cost fares of new intercity bus services. A second financial issue, therefore, may be the development of mechanisms to ensure that disadvantaged persons can afford to use these services.

Vehicle Design Problems

Intercity buses are built for high-speed service over

highways rather than stop-and-go operations on city streets. Their transmissions are geared for express service; they have high-backed upholstered seats, narrow aisles, no room for standees, a single door in the front, and, in most cases, no fare box. Due to these problems, use of intercity buses in main-line transit service (except for park-and-ride or express services) may prove to be extremely difficult.

Labor Conflicts

Existing Section 13c agreements between management and the labor unions of most transit authorities probably represent the most insuperable barrier to the use of intercity buses and other services discussed later in this paper. Such agreements specify that all services provided by the transit authority must be operated by members of the authority's labor union. Without union approval, therefore, it may be impossible for transit authorities to contract for service provided by the buses and drivers of private operators. In addition, it appears that the U.S. Department of Labor may require that a service contract between a transit authority and a private bus company be accompanied by the extension of 13c protections to the company's employees. Wishing to avoid further entanglements with Section 13c, transit authorities may decide not to write contracts with private operators. Finally, a transit authority might wish to lease intercity buses and operate them with transit union labor for the duration of an energy emergency. Yet, because the authority probably would have to acquire new funding in order to pay for the operating costs of these vehicles, the authority's labor union might be able to demand a new or supplemental 13c agreement to cover these new funds. The writing of such an agreement could take months; the buses and the new funding probably could not be used during the negotiation period. Moreover, the writing of a new or supplemental 13c agreement might open up a whole range of old labor issues for new negotiations. In brief, Section 13c requirements may act as a powerful barrier to transit authority use of privately owned intercity buses.

Vehicle Availability

Most intercity bus companies operate charter as well as fixed-route services. Many other operators provide only charter service. The vast majority of charter trips is for sightseeing and recreational purposes. These trips generate a major portion of the patronage, revenues, and employment in the tourist and sports industries, particularly those that are situated in rural areas.

Intercity buses that are used for charter purposes do constitute a reservoir of vehicles that could be used to expand existing services and/or introduce new routes between cities, suburbs, and rural areas. On the other hand, reducing or eliminating charter services would mean a serious loss in revenue and employment for important industries and regions. It should also be noted that employers, resorts, and other elements of the private sector are likely to contract for use of intercity buses during a fuel shortage in order to maintain their own operations. Few buses, therefore, may be available for publicly sponsored services. (Privately sponsored services, in fact, may be most desirable because they can be implemented quickly, thus avoiding difficult federal, state, and local laws, regulations, and procedures. They may also be more efficient in that they respond directly to market forces.)

Purchases or leases of new vehicles may be perceived as an alternative means of acquiring vehicles for expanded or new intercity bus operations. Long lead times for vehicle procurement, however, will preclude use of this option unless it is exercised in advance of a shortage and intercity bus companies are certain that these vehicles will produce revenues for them. The shortage of capital in the intercity bus industry is a further deterrent to new vehicle acquisitions.

EXPANDED USE OF SCHOOL BUSES

According to the National School Transportation Association (NSTA), there are approximately 390 000 school buses in use in the United States (including spares, equal to about 10 percent of the total). This fleet is more than five times larger than the nation's total stock of mass transit buses and rail vehicles (8). There are nearly twice as many school buses as there are taxis in this country (9). According to NSTA, the fleet is growing—most recently at a rate of about 4 percent/year. This growth is attributed, in part, to school desegregation and continued suburbanization.

Some 85-90 percent of the school bus fleet is composed of large vehicles, while the other 10-15 percent includes vehicles that carry less than 16 passengers (e.g., vans and station wagons). Further, approximately 60 percent of the fleet is owned by public-sector organizations, including school systems and the military. The remaining 40 percent is owned by private and parochial schools, private companies, and other organizations.

To date, successful demonstrations of the feasibility of using school buses in public transportation service have been conducted in Morehead, Kentucky; Newton and Boston, Massachusetts; Dade County, Florida; Arlington, Virginia; Klamath Falls, Oregon; Wilkes-Barre, Pennsylvania; and Rhode Island. School buses have been used to provide fixed-route, DAR, and subscription (prearranged group) service. Also, these demonstrations have focused on different populations, including the elderly, poor, children, and, in several cases, the general public.

It is notable that only one of these demonstrations (Dade County) involved changes in school hours due to a fuel shortage. Two other demonstrations (Boston and Wilkes-Barre) included changes in school hours as a result of natural disasters. None of the demonstrations mixed school children with adults.

Strategies and Obstacles

Studies investigating the potential for greater public use of school buses generally agree that such use is a good idea (10-13). What is more important is that several of these studies suggest that school buses could play a valuable role in energy conservation and in local responses to future energy emergencies. For example, school buses could be used for the following purposes:

1. To reduce headways or crowding on buses and rail vehicles on existing transit routes;
2. To create new transit routes in urban areas;
3. To provide feeder service to line-haul transit routes, either through DAR or fixed-route operations;
4. To provide park-and-ride service to major employment sites;
5. To ensure that necessary transportation services are provided to elderly, handicapped, and other disadvantaged persons; and
6. To provide community transit services that respond to the short-distance travel demands of persons traveling during off-peak hours.

Studies and service demonstrations undertaken thus far indicate, however, that there are significant obstacles to widespread use of school buses to transport the general public. In some cases, these obstacles overlap with those discussed in relation to intercity buses. They include fuel availability, regulatory requirements and prohibitions, cost and funding questions, school bus design problems, labor problems, and vehicle availability.

Fuel Availability

Under DOE's gasoline-allocation program (which is activated during shortages), school bus operators who have bulk storage facilities may receive 100 percent of the fuel that they used from November 1977 through October 1978.

(Diesel-powered buses, on the other hand, are eligible for unlimited fuel supplies under DOE's Special Rule 9 of the allocation program. This issue, therefore, does not concern the operation of diesel-powered school buses.) If they require additional fuel, they must request it from state emergency set-asides or they must apply to DOE's Office of Hearings and Appeals (OHA) for an increased allotment. However, most operators have gotten fuel from state set-asides rather than OHA during past shortages.

Small school bus operators who do not have bulk storage facilities do not have guaranteed access to fuel supplies. They must compete at retail pumps or they must make arrangements to acquire fuel from other users of gasoline who have bulk storage and fuel priority under DOE's allocation program. Purchasing fuel at retail pumps is time-consuming and the availability of fuel may be uncertain. New arrangements with other bulk purchasers of gasoline may be difficult to make because of industry competition within localities.

In addition, school bus operators, like intercity bus operators, would be severely affected if DOE allowed its petroleum-allocation regulations to expire in September 1981. Failure to extend these regulations would result in sharp price increases when fuel is in short supply and would severely limit the capability of school bus operators to expand service or even continue their existing operations.

Regulatory Requirements and Prohibitions

State laws and regulations pertaining to school bus use vary considerably. Although nearly half the states allow school buses to be used for nonschool purposes, the other half either restricts such use to certain groups and segments of the populations (e.g., the elderly) or totally prohibits nonschool use.

Several states (e.g., Virginia, New Mexico, and Oregon) have already responded to this problem by passing laws that allow nonschool use during emergencies. On the other hand, there are at least a dozen states that do not have such laws and whose governors do not possess emergency powers to suspend existing laws and regulations. This problem, therefore, remains a serious one.

Most states, as well as the federal government, have other laws or regulations about the equipment that must be used in school bus operation. For example, school buses must operate flashing lights when they stop to pick up or drop off school children. These lights must be disconnected if the vehicles are operated in nonschool use. Such laws and regulations discourage use of school buses to transport the general public.

Franchising requirements at the federal, state, and local levels may slow the introduction of school buses into mass transportation service. Currently, the ICC, virtually all state PUCs, and most local licensing authorities do have emergency powers that enable them to authorize immediate introduction of new fixed-route transportation services in advance of normal (and lengthy) franchising processes. These agencies must determine, however, that a true emergency exists before they issue emergency operating rights (i.e., franchises) to operators. Without a severe fuel shortage, it is unclear if regulatory authorities will use their emergency powers to permit school bus operators to provide new transportation services for the general public.

Finally, there is some question as to whether DOT's Section 504 regulations would be applied to school buses in public service supported with federal funds during a fuel shortage. If these regulations were applied, the fact that school buses are generally not accessible to the handicapped might prove to be a significant barrier to expanded school bus operations.

Costing and Funding

It will not be inexpensive to operate school buses for the transportation of persons other than school children. A 1978 study estimated these costs to range between \$0.68 and

\$1.78/vehicle-mile. However, in 1977, the average operating cost was \$2.15/vehicle-mile for all transit modes (10).

Depending on the type of service in which school buses are used, fares may or may not be an appropriate method of fully funding vehicle operating costs. If, for example, school buses are used to provide park-and-ride express service from neighborhoods to major employment sites, fares could be set at a level that would fully cover operating costs. If, on the other hand, school buses are used to supplement existing transit vehicles on main-line routes, it seems likely that fares would have to be set at the usual below-break-even level. Additional operating subsidies, therefore, would be required.

School Bus Design Problems

Most school buses are designed for school children and for school-related service; they are not designed to transport adults. Standard school buses have low ceilings, small seats, little knee room, no hand rails for standees, narrow aisles, a single door in the front, and high steps. Some of these problems, in fact, are the result of federal regulations (e.g., the distance between seats and the size of the seats). Further, standard school buses are light-duty vehicles that are not built for transit service. Extensive use of these vehicles in line-haul transit operations would probably lead to substantial maintenance problems, more rapid deterioration of the national school bus fleet, and a need for capital dollars to replace vehicles that wear out because of expanded operations.

It should be noted that there is an alternative to the standard school bus. Several companies are now manufacturing a type of heavy-duty school bus that is quite durable and appropriate for nonschool use; it is also somewhat more expensive than a standard school bus. Relatively few of these vehicles are in service at this time.

Labor Problems

Section 13c agreements are likely to pose a significant obstacle to the use of school buses in mass transportation service, just as they will to the use of intercity buses. Without union approval, it may be impossible for most transit authorities to contract for use of school bus vehicles and drivers. Even if transit authorities do win the right to contract for such services, it may be required that 13c protection be extended to the employees of the contractor as part of such agreements. Negotiations over agreements could take months, with the desired services not provided in the meantime.

Vehicle Availability

The availability of school buses is a major issue standing in the way of general public use of these vehicles. During the school year, the morning peak period for school transportation closely resembles the morning peak period of transit demand in most cities. Conflict between school transportation demand and transit demand is only slightly reduced during afternoon hours.

Evidence of these problems was obtained in Illinois and Virginia, where it was found that, depending on the county studied, between 75 and 95 percent of the school bus fleet was in use during the morning and afternoon travel periods (generally 6:00-9:00 a.m. and 3:00-6:00 p.m.). About 20-30 percent of the fleet was being operated between 9:00 a.m. and 2:00 p.m. In addition, a changing percentage of the school fleet was unavailable during morning, midday, evening, and weekend hours because of maintenance work, legally mandated bus inspections, and extracurricular school activities (11).

School bus hours, then, present a major problem during the school year. School hours may need to be changed or shortened in many areas if it becomes necessary in an energy emergency to make school buses available for

supplementary peak-period transit services. Continuing increases in the number of working mothers, however, may act as a powerful counterforce to school-hour changes (due to disruptions in work schedules that would result if children were to be home at different hours), unless a fuel shortage is judged severe. Therefore, in lesser-shortfall situations, it may be feasible to consider using school buses only for off-peak services. Fuel shortages during the summer months may pose less of a problem in terms of vehicle availability than shortages during the school year, provided sufficient preplanning is done and mechanisms are in place to allow rapid deployment of such vehicles.

EXPANSION OF DAR, SRT, AND JITNEY SERVICES

DAR, SRT, and jitney services are considered together because they fall within the hail-or-phone category defined by Kirby (2). They are not strictly fixed-route, fixed-schedule services but are at least somewhat demand responsive, thus providing a degree of service somewhat more personalized than traditional transit services using large vehicles.

DAR refers to the wide range of demand-responsive services that are generally provided by public agencies (usually transit authorities) and private nonprofit organizations with vans and small buses. SRT operations frequently provide the same services but are generally controlled by private taxi companies that operate regular passenger sedans, often under the direction of a public agency. In a real sense, DAR and SRT services frequently are very similar, differing only in their ownership and vehicle types.

A variety of demand-responsive services can be and has been provided by DAR and SRT operators. These services include (a) basic DAR service, (b) feeder to fixed-route bus service, (c) fixed-route bus replacement service, and (d) subscription service. These services may operate on an immediate- or advance-request basis or may serve only particular trip purposes or destinations.

As part of a recent DOT-sponsored study, Systan, Inc., verified the existence of 308 U.S. DAR and SRT services. Systan also produced the following inventory of U.S. paratransit systems (14), which distinguishes between DAR and SRT services on the basis of service type and market, i.e., the availability of the services to the general public (general market) or only special user groups, such as the elderly and handicapped (target market).

Service	Market		Unclas- sified	Total
	General	Target		
DAR	74	135		209
SRT	42	27		69
Integrated	3	-		3
Mixed (DAR and SRT)	1	5		6
Unclas- sified	2	11	8	21
Total	122	178	8	308

The above table does not include DAR and SRT services that are provided only to the clients of human service agencies. There are at least 200 of these services in the United States. Given that there are 969 transit systems in the United States, it is clear that DAR and SRT services have not achieved broad distribution throughout the United States. They appear primarily in small cities, many of which do not have other mass transit systems. Moreover, Michigan and California claim 147 of the 308 DAR and SRT systems identified by Systan. No aggregate data exist regarding the total number of vehicles used in DAR and SRT services. The Systan study, however, indicated that the median number of vehicles in DAR and SRT operations is about 5. Given this median number, there are probably at least a few thousand vehicles providing DAR and SRT service in the United States. This number is minuscule

compared to the number of taxis (193 000), transit buses (52 900), and intercity buses (20 200) currently operating in this country, according to the American Public Transit Association and others (3, 15).

Although DAR and SRT services exist only to a limited extent in the United States, these operations seem quite substantial when compared to the distribution of jitney services. To date, there are only nine legal and formally organized jitney services in the United States. The two oldest legal jitney services operate in Atlantic City and San Francisco. Illegal but operative jitney services exist in four other cities.

Jitney services are available for use by all members of the general public. They usually operate hail- or flag-stop service along fixed or semifixed routes with vans or passenger sedans. Individual ownership and operation of vehicles are the norms rather than the exceptions. Fixed schedules are rare.

DAR, SRT, and jitney services generally are regulated at the local level by public service commissions. (Some DAR and SRT services are not regulated by such commissions. Instead, the local transit authority determines the operating characteristics of the service.) These commissions set fares and determine vehicle and service characteristics. In the case of some jitney services, the local commissions also set vehicle routes. Finally, because they control entry into the market, these commissions have also been largely responsible for the lack of growth of DAR, SRT, and jitney services. Faced with strong opposition from existing transportation providers (and, quite often, their labor unions), the commissions historically have acquiesced and voted to maintain the status quo (i.e., premium-ride taxi service only).

Recent developments indicate that the situation may be changing. Section 505 of the Surface Transportation Assistance Act provides that a taxi company may receive a 100 percent rebate of its gasoline and other fuel taxes if the company is not prohibited from furnishing (with consent of the passengers) shared transportation. This development may stimulate local operators to push for regulatory changes that will permit them to offer SRT service. Further, in November 1979, the International Taxicab Association (ITA) announced its endorsement of SRT service and stated its support for expansion of these services. In addition, several cities—notably San Diego and Seattle—have recently (a) eliminated barriers to market entry by new operators, (b) allowed competitive pricing to determine fares, and/or (c) eliminated regulations prohibiting the introduction of both SRT and jitney operations. Finally, increasing federal interest in these services is indicated by DOT's funding of 17 SRT and DAR demonstration projects and a study of an extant jitney service during the past seven years.

Five other factors argue that public- and private-sector interest in DAR, SRT, and jitney services may increase substantially during the next several years. First, rapid inflation and sharply rising fuel prices should stimulate taxi operators to seek new means of maximizing their revenues. SRT and jitney services may be perceived as a way of gaining more passengers (and more revenue) while operators use the same amount of fuel. Second, government decision makers at the federal, state, and local levels may perceive that the broad expansion of DAR, SRT, and jitney services could discourage second-car purchases by the public, thereby assisting the long-term goal of energy conservation. Third, the probability that the United States will experience repeated fuel shortages during the next decade may stimulate local governments and regulatory authorities to explore alternative methods of retaining personal mobility during these shortages. DAR, SRT, and jitney services can assist in accomplishing this goal. Fourth, transit authorities may view SRT and jitney services as a means of reducing crush loading on their vehicles, which results from a fuel shortage. Finally, public demands for more public transportation services during a shortage may force decision makers (i.e., regulatory authorities) to

encourage the introduction of shared-ride operations by reducing or eliminating regulatory obstacles.

Strategies

Several kinds of shared-ride services might be introduced in response to the need for energy conservation and local preparedness for future fuel shortages. These services include the following:

1. Simple dial-a-ride or SRT service for the general public;
2. DAR or SRT service with open market entry for the general public;
3. DAR or SRT service for elderly, handicapped, poor persons, and the clients of human service agencies;
4. Feeder service to mass transit routes and stations;
5. Supplemental service along existing transit routes;
6. Replacement service on existing transit routes; and
7. New fixed-route or semifixed-route service (particularly local operations that serve travel needs within a community).

Depending on local circumstances and needs, the last four services noted above might be permitted under a system of open market entry to keep fare levels low and the amount of service high.

A simple conversion of premium-ride taxi services to shared-ride services could have an important impact by increasing the number of passenger trips per hour that an individual taxi could make. SRT service would also help to minimize deadheading by taxis. (High demand may necessitate the use of vans or minibuses. In this event, SRT operations would become DAR services.) If DAR or SRT service was combined with a temporary or permanent suspension of market-entry restrictions, even greater amounts of service could be provided. Existing companies and new private entrepreneurs could offer as much demand-responsive, shared-ride service as they wished in order that all citizens could have access to local transportation services.

DAR or SRT service for particular segments of the population could be an invaluable means of maintaining the mobility of certain persons (e.g., the elderly, handicapped, poor, and clients of human service agencies). It is quite conceivable that these persons will have difficulty in using mass transit during a fuel shortage due to heavy crowding, while taxi services may suddenly become very popular with upper-income persons because of the unavailability of gasoline. DAR and SRT services that are reserved for certain persons could respond to these problems. (It should be noted here that the majority of existing DAR and SRT services is reserved for special populations such as the elderly and handicapped.)

Feeder services to mass transit routes and stations could increase public access to transit. Through fixed-route, semifixed-route, or DAR operations, taxi companies, new entrepreneurs, or public-agency-sponsored services could link up neighborhoods and suburban areas with main-line transit routes, thereby relieving congestion at transit stations and making transit available to persons (such as the handicapped) who cannot walk, bicycle, or drive to transit stops. St. Bernard's Parish in Louisiana, for example, has had a taxi-based feeder system in operation since 1974 and has seen ridership climb from 75 trips/month to more than 1000 trips/month (16).

Supplemental service along existing transit routes (by using a jitney-type operation) could help to relieve the problem of overloaded transit vehicles during peak hours. Such a service has been successfully provided along San Francisco's Mission Street for many years (17).

Replacement service (e.g., at night, in areas of low population density, or at the outer ends of transit routes) could free transit vehicles for use on other routes and could increase the availability of transit vehicles for needed maintenance work. Evidence of the effectiveness of this

practice can be seen in the Trans-Cab operation in Ontario. In this case, replacement of fixed-route bus service with taxi service led to a tripling of ridership and a 75 percent reduction in the operating deficit for the operation (16).

Finally, taxis, vans, minibuses, and other vehicles could be used to inaugurate new fixed or semifixed routes within localities. Vehicles operating along these routes could operate with hail-or-phone stops or could have regular routes and schedules. Westport, Connecticut, has been perhaps the most successful example of this kind of service. The Westport operation serves many travel needs within the community, including shopping trips, after-school activity transportation, commuter service to a nearby rail station, and the like. Other communities could reduce local energy consumption by replicating the Westport system.

Obstacles

While all of the above services may be useful for energy conservation and may serve as a response to energy emergencies, there is a variety of barriers that will affect the implementation of these services. These barriers include problems similar to those affecting the service types discussed earlier: (a) fuel availability, (b) legal regulatory issues, (c) funding and fare questions, (d) labor problems, (e) vehicle supply, (f) operational issues, and (g) public information and marketing needs.

Fuel Availability

Small taxi operators and other passenger transportation providers (including private entrepreneurs who use their own vehicles) who do not have bulk storage facilities do not have guaranteed access to fuel supplies. Under DOE's allocation program, they must compete at retail pumps for fuel or, if they are defined by DOE as priority users, they can make arrangements to acquire fuel from other users of gasoline who have bulk storage and fuel priority under DOE's allocation program. Purchasing fuel at retail pumps is time consuming and the availability of fuel may be uncertain. New arrangements with other bulk purchasers of gasoline may be difficult to arrange because of additional paperwork requirements and business competition at the local level.

In addition, operators of taxis, jitneys, and other such services who are bulk purchasers of fuel, like the service providers discussed earlier, would be severely affected by a DOE decision to allow the petroleum-allocation regulations to expire in September 1981.

Legal and Regulatory Issues

Local commission prohibitions on shared-ride service would have to be altered to permit or require shared-ride operations of the types described above. In addition, these commissions would have to authorize jitney-type operations to facilitate feeder service or supplemental service along fixed routes. In areas that have mass transit services, the local transit authority would probably have to provide authorization for supplemental service or new fixed routes that would be operated by private entrepreneurs. Finally, several states would have to have new services (particularly of a fixed-route nature) approved by the state PUC.

A more general question concerns whether market entry and fares for taxi services should continue to be regulated at all. As noted above, several cities, including San Diego and Seattle, have made major moves toward deregulation of their taxi industries. The results of these changes are not yet clear. If productive new SRT and jitney services with reasonable fares eventually are established, it may be worthwhile for other localities to reconsider their regulation of the taxi industry.

Funding and Fare Questions

Fares for current DAR services range from zero to

\$2.00/trip, with a median fare of \$0.50. SRT fares range from zero to \$1.00/trip and also have a median fare of \$0.50. Many DAR and SRT services, however, do receive public subsidies. In some cases, these subsidies are provided only to particular persons (e.g., in Danville, Illinois, the elderly and handicapped are subsidized) through user-side subsidies. In other places, such as Merced, California, users pay a flat fare, and a public agency absorbs the difference between fare revenues and the total cost of providing service (14).

Jitney fares generally vary with distance traveled. For short-distance trips, the fare for jitney service may not be much higher than the cost of using transit service. Over long distances, however, jitney fares usually exceed transit fares. No jitney services receive public subsidies at this time.

To promote ridership during both fuel shortages and times of normal energy supplies, localities that are starting new DAR, SRT, and jitney services may wish to provide public subsidies in order to keep fares as low as possible. Finding funding sources for such subsidies, however, will not be an easy task. DOT's Section 5 and Section 18 programs appear unable to support extensive funding of shared-ride operations. Moreover, these programs carry with them Section 13c labor requirements, which often prove to be major deterrents. State and local governments, in turn, are under steady pressure to reduce taxes. In short, localities will have to grapple with a difficult funding problem in order to subsidize shared-ride operations on other than an emergency basis.

Labor Problems

Existing 13c agreements, and the possible need to negotiate new such agreements to cover new services, have been discussed in earlier sections in connection with intercity bus and school bus operations. They pose as great an obstacle to the use of taxis, jitneys, and other demand-responsive services that might be supported in part by federal funds for all the same reasons.

Vehicle Supply

Existing public and private transportation companies may not have enough vehicles to operate new shared-ride services and may not be able to afford new vehicle purchases with only their own resources. Taxi companies tend to be particularly short of capital (as are many school bus and intercity bus companies). Federally funded transit authorities cannot purchase vehicles for DAR, SRT, or jitney operations without running afoul of Section 13c. Vehicle acquisition, therefore, is likely to be a serious problem. The only recourse of existing taxi companies and other potential providers of DAR, SRT, and jitney services may be to contract for service with private individuals who are willing to operate their own vehicles in shared-ride operations.

Operational Issues

A number of technical difficulties or questions are likely to require resolution in connection with emergency establishment and operation of jitneys, SRTs, and other demand-responsive services. Such potential difficulties include (a) communications, (b) shared-ride versus exclusive-ride taxis, and (c) equity toward the service population.

Several of the shared-ride services described above require dispatching to be successful. The acquisition and installation of radios in vehicles currently unequipped will require a substantial amount of time and money, both of which are likely to be scarce in an energy emergency.

It is unclear whether taxi patrons should be given the choice of shared-ride versus exclusive-ride service with differential fares in a fuel shortage, or whether portions of the taxi fleet should be designated for shared-ride service

only in such a situation. A decision on how the shared-ride option is presented and structured should be made in advance of any such shortage.

Elderly, handicapped, and poor persons, together with the clients of human service agencies, may be squeezed out of existing taxi services due to new demand for taxi services from wealthier persons who wish to abandon their cars. Wealthier persons will pay cash (an attractive alternative to taxi companies who usually bill human service agencies for client trips). Moreover, taxi drivers may expect higher tips and fewer robberies (or other personal crimes) if they focus their operations in upper-class neighborhoods. The result may be a concentration of taxi services in certain sections of metropolitan areas and a serious decline in the availability of taxis in other sections.

These and other operational issues will need to be dealt with by areas intending to focus on such services as significant elements of their response to a fuel shortage.

GENERAL ISSUES FOR CONSIDERATION

In addition to the specific issues related to various service types, a number of more general issues are likely to arise in connection with all of the above services, or indeed with only emergency transportation services initiated in response to a major fuel shortage. These issues are briefly discussed here.

Planning

In order to marshal any of these resources in time to be of use in a short-term emergency, it is essential that sufficient time and expertise be available to plan for such contingencies and negotiate with would-be service providers. Development of new intercity bus service, formal or informal demand-responsive services, or special services that use school bus equipment cannot be done overnight. Consequently, it is advisable that designations of planning responsibility be made as soon as possible within states and localities and that likely service possibilities requiring advance coordination begin to be identified.

Marketing and Public Information

In order for emergency services to be used most productively, it will be important that they be targeted toward particular markets and be accompanied by effective public information programs. The development of such programs likewise takes a significant amount of time and resources: establishing telephone information lines, publishing schedules, providing route or service area maps to aid would-be passengers, or simply educating people about the ways in which unfamiliar service types operate.

Funding

Both rural and urban areas that could conceivably benefit most from use of the above kinds of services in energy shortages are already severely constrained in terms of available capital, operating, and planning funds to meet already-identified needs. Additional funding geared specifically to energy contingency and conservation planning is urgently needed; beyond the planning phase, states and localities should continue to press for the establishment of a special reserve of funds—free, if possible, of Section 13c restraints—to be made available for the introduction of new auxiliary-paratransit services during fuel shortages.

Fuel

The availability of sufficient fuel to operate many of the service types discussed herein will become a critical issue if the petroleum-allocation regulations are terminated after September 1981. If termination occurs, the willingness to pay the market price will be the factor determining which users will obtain available gasoline. Such action will result

in severe economic consequences for providers of the services discussed in this paper (as well as all other essential fuel users). Thus, it is in the interest of special-service providers and localities likely to be dependent on such services in an emergency to argue for an extension of the allocation regulations. If such an argument fails, other ideas for ensuring fuel supplies for auxiliary-paratransit services must be considered. Among them are, for example, making grants or low-interest loans to operators so that they can continue to purchase fuel in the face of sharply rising prices during a shortage and encouraging auxiliary-paratransit operators to construct and fill emergency fuel storage facilities when supplies are relatively unconstrained so that the contents can be drawn down during periods when a shortage forces the price up.

Labor

The single most important factor inhibiting the speedy introduction of any of the above services is Section 13c of the Urban Mass Transportation Act of 1964. The need to extend existing 13c agreements to cover paratransit or auxiliary services, or to negotiate new agreements where federal support is desired, is likely to deter many local authorities from initiating planning for such services. It may be possible to override such agreements for the sake of providing urgently needed public services if a fuel emergency is severe enough. In the absence of a dramatic threatening situation, however, it is unlikely that the impetus will exist to suspend 13c. Consequently, it may not be possible to use Section 5 or Section 18 funds channeled through transit authorities to support such services. Funding obtained from other federal programs that support transportation activities may be a partial solution. Such funds, however, usually place restrictions on who may use the services provided. Alternatively, it might be appropriate for DOT to consider the possibility of asking the U.S. Congress for a special operating assistance appropriation that would be free of 13c obligations and that would be held aside for use during fuel shortages, possibly with additional support from other federal agencies.

RECOMMENDATIONS

Rental-Lease Vehicles

None of the ideas described in the rental-lease vehicle section have been explored in any depth as yet. However, as stated earlier, some level of interest has been perceived within the industry to pursue at least some of these options. Clearly, opportunities do exist for expanding the role of rental-lease vehicles in local energy conservation and contingency programs. Questions that need to be explored in pursuing these opportunities include the following:

1. The extent to which private businesses and government agencies already lease vans for vanpooling,
2. The degree to which lessees are exercising the lease-purchase option,
3. The potential market for vanpooling through vehicle leases by employers,
4. The need for and cost of marketing programs to convince employers to lease vans for vanpooling,
5. The feasibility of the van- and car-lease concept,
6. The interest of rental-lease agencies in simultaneously marketing a wide range of high-occupancy-vehicle programs to employers,
7. The relative operating costs and administrative requirements involved in using rental-lease vehicles instead of taxis and/or school buses for local public transportation services in rural areas; and
8. The interest of states in any or all of the programs described herein.

Intercity Buses

Section 13c requirements and limited vehicle availability are the most serious obstacles to expansion of intercity bus services. These constraints, together with the currently depressed state of the intercity bus industry, argue that the first priority should be to increase the load factors on existing routes. Average load factors were 45 percent in 1978. The industry has argued that these load factors could be increased to between 61 and 70 percent with no change in services. Moreover, an industry report claims that an increase to 65 percent would reduce the nation's fuel consumption by 1.4 million bbl/year (7).

Obviously, these load factors may be impossible to achieve in every intercity bus operation. The industry's estimates of fuel saving, therefore, may be overstated. These estimates do indicate, however, that there is enormous potential for expanded ridership without the introduction of new services.

As a second priority, public agencies should cooperate with elements of the private sector in the planning of new services that will be needed in the event of future fuel shortages. To the extent that buses are available (and are not needed for charter services), park-and-ride or commuter express services sponsored by the private sector and fixed-route operations sponsored by recreation areas may be the best use of available vehicles.

After the preceding options have been explored, contingency planners should examine the need for publicly sponsored intercity bus services. If intercity buses are needed to provide new fixed-route services in areas that are served by federally funded transit systems, local government bodies should contract for and/or administer these services. Through this process, conflicts with transit labor unions can be kept to a minimum. Federal funds, however, will not be available to support these services unless local 13c agreements are revised or federal 13c requirements are changed.

To the extent that public funds are used to support new or expanded intercity bus services, user-side subsidies may be the most appropriate means of providing this support. User-side subsidies can help to minimize costs to the public sector because, unlike producer-side subsidies, user-side subsidies do not obligate the subsidy provider to absorb whatever level of deficit an operator incurs in service. Instead, subsidy is paid on a per-trip basis (sometimes only for trips by particular persons, such as the poor or the elderly), and the operator is encouraged to seek riders who are eligible for subsidy payments. User-side subsidies also permit experimentation. Instead of locking government into long-term relations with operators and their labor forces, user-side subsidies can be instituted and withdrawn with relative ease. This flexibility may be invaluable if localities want to provide subsidies during shortages and not as an ongoing energy conservation incentive.

School Buses

The most intractable obstacles to expanded school bus use are

1. Section 13c requirements that will prevent federally funded transit authorities from contracting for service with school bus operators,
2. A lack of public money to pay for the operating costs of school buses,
3. The unavailability of large numbers of school buses during the hours when they are needed most (assuming, of course, that school hours are not changed), and
4. Vehicle design problems.

If these problems are not remedied, school buses will be able to play only a limited role in providing transportation to the general public. It is true, however, that school buses may be the only public transportation resource that is available in many communities (particularly in rural areas).

School bus operators also represent a considerable reservoir of private-sector expertise in transportation operations. This expertise should be tapped as much as possible.

In metropolitan areas, the few school buses that are available when school is in session might best be used in park-and-ride express services during peak hours. (Employer adoption of variable-work-hour programs could expand the usefulness of school buses in providing park-and-ride service after these vehicles complete their school transportation routes.) Such services could be financially self-supporting, although subsidies from local and state governments and from employers would be beneficial to keep fares as low as possible in order to attract riders. Employers or local governments could assume responsibility for the administration of these services, thereby eliminating potential conflicts with transit labor unions. Park-and-ride services would have few operating difficulties (except for a lack of fare boxes) because vehicles would not be continually boarding and discharging passengers. Vehicle deterioration would be kept to a minimum.

School buses could also provide feeder services from outside the boundaries of transit authorities to the ends of transit routes. Community transit service within transit authority districts and suburban areas could serve populations that currently have no access to transit service (e.g., school children, the elderly, and parents who need to travel short distances for shopping, health, or work-related reasons). In both cases, however, school bus service for the public would have to be administered by local governments rather than the transit authority in order to eliminate labor problems. Further, federal funds could not be used to support these services. Local and state funds could be used, however. Problems with the operation of school buses in community transit services might be significant due to simultaneous loading and unloading of passengers. Because large numbers of school buses will not be available during peak hours, these services might be best provided during midday hours and evenings.

Currently, few rural areas have transit systems or receive federal funds for public transportation. In most rural areas, therefore, problems with Section 13c will not prevent the implementation of school bus services for the general public. (The exception to this argument will be rural areas that receive Section 18 funds. These areas must provide 13c protections to local employees of public transportation services.)

Because school hours are unlikely to be changed except in the event of a severe shortage, general public use of school buses may be possible only during midday or evening hours. Services that might be provided include DAR operations and subscription services to regional employment sites and health centers (although taxis and vans, if available, might provide this service less expensively and more efficiently in low-density areas). In all probability, however, some amount of subsidy from state and/or local governments will be needed to finance these operations.

DAR, SRT, and Jitney Services

The presence of a fuel shortage may not provide any impetus to change existing 13c agreements. If this is the case, the following actions may be most desirable and most feasible:

1. Conversion of existing premium-ride taxi services to shared-ride operations, with or without open market entry—Such action would require only that local fare structures for taxi service be altered.
2. Alteration of local and/or state regulations to permit private companies to introduce jitney services where these operations would not compete with existing transit operations—Jitney services might act as feeders to existing transit routes or they might serve wholly new geographical areas and/or trip purposes.
3. State and local government subsidization of new DAR, SRT, and jitney services—These services probably would

have to be administered by a local government agency other than the transit authority in order to avoid conflicts with 13c constraints. Under these arrangements, localities could stimulate the development of all types of DAR, SRT, and jitney services except those that compete with the services of a transit authority. User-side subsidies might be the most cost-effective and flexible means of providing public-sector financial support for new services.

4. Concentration of new service development on segments of the population that will be most affected by a fuel shortage (i.e., elderly, handicapped, poor persons, and clients of human service agencies).

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Energy Contingency Planning for the U.S. School Transportation Industry, 1979-1980

National School Transportation Association Energy Committee

Barring some unforeseen solution to the world's current energy situation, such as the discovery of vast fossil-fuel deposits or the development of a cheap synthetic energy source, it appears clear that the United States will have to modify its transportation systems. A primary factor in such modification will be the sharply curtailed use of and dependence on the private automobile.

Based on the best information available today, the world's energy picture presents a problem of a very long-lasting nature. Whether the United States will adapt to this situation voluntarily or involuntarily remains to be seen, but it seems indisputable that implementing energy-conservation measures and maximizing the use of available transportation modalities are inevitable steps.

As the nation adjusts to these new transportation circumstances, it will be necessary for each locality to provide for the mobility of its citizens. The development of energy contingency plans is an essential first step in this direction.

The first obligation of the school transportation industry is the safe transportation of children to and from school and school activities. But, due to the shortage of fuel, school buses will be necessary for broader community service.

It is imperative to realize that planning for future transportation needs cannot be addressed in a compartmentalized fashion. It is assumed at the outset that comprehensive solutions—the only sort acceptable for such a pervasive problem—must involve many elements of society in general and the transportation community in particular. Therefore, only an approach that integrates all transportation providers can deal adequately with the problem.

ENERGY CONTINGENCY PLANS

Energy contingency plans are designed to prepare for both immediate and long-range dependence on multipassenger vehicles, which should result in an overall petroleum saving. Most often, energy contingency planning addresses the need to increase the capacity of local bus transportation systems. At the same time, it prescribes methods of apportioning travel demand in a more uniform way and over a longer time period and encourages greater acceptance and use of taxis, vans, and informal multipassenger travel modes.

The chief elements in such planning are the process and the end product. The process describes the way in which plans are developed, identifies the participants, and assigns responsibilities. The product is a list of actions to be implemented. Moreover, energy contingency plans are generally keyed to levels of crisis and suggest which actions are most appropriate at given levels of fuel shortage.

In developing this document, the National School Transportation Association recognized that, although most communities have no transit systems and many have no rail or intercity bus systems, virtually all have school transportation systems. The existence of such systems means that school buses are available for use. Therefore, faced with increasingly scarce and expensive fuel, energy contingency planning that takes the presence of these vehicles into account can assure the community of the continued mobility of its population in order to maintain public welfare, support economic vitality, deliver public services, maintain the quality of life, and be prepared for emergencies.

The school bus operator may find that energy contingency planning presents additional opportunities. The curtailment of private automobile travel, whether as a matter of personal choice, economic necessity, or