PROCEEDINGS —

Twenty-second Annual Meeting

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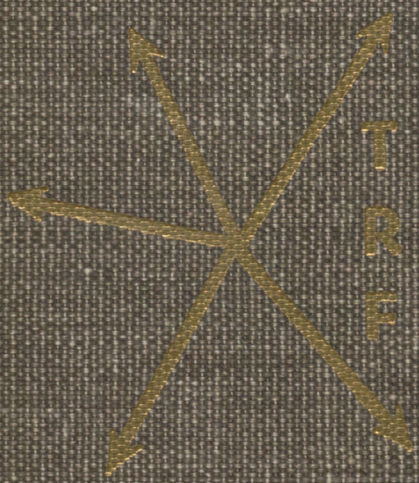

TRANSPORTATION RESEARCH FORUM

PROCEEDINGS —

Twenty-second Annual Meeting

Theme:

"Opportunities and Challenges in the New Environment of Transportation"

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San Francisco, California

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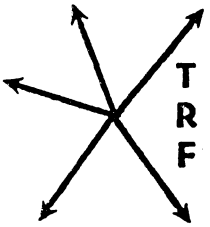

TRANSPORTATION RESEARCH FORUM

Realities of Public Transport in Small Urban Areas

*by A. D. Fiander**

ABSTRACT

THIS PAPER includes a summary of relevant observations derived from a variety of projects dealing with public transportation services in urban areas with less than 100,000 people. The paper includes consideration of both fixed-route systems and vanpooling operations. A review of recent national trends (since 1974) of the following fixed-route operating characteristics for small transit systems is presented: a). revenue-cost ratios, b). subsidy per capita, c). ridership per capita, and d). passengers per mile of service. These trends are assessed in the context of their relationship to the escalating fuel costs and the increased energy consciousness which occurred during this period.

The paper also includes observations regarding implementation of commuter pooling services at industrial sites in small, rural oriented areas. Experience on two particular case studies is used to illustrate the problem associated with implementing such services.

INTRODUCTION

This paper presents an overview of experience derived during the past few years from a variety of projects dealing with public transportation services in small, urban areas. This experience relates to both general municipal oriented systems as well as to services associated with specific industries. In the former case, the experience noted relates to conventional fixed-route transit systems. The experience with specific industrial locations relates to commuter pooling services.

The comments in this paper are based on circumstances which arose in conjunction with projects carried out in the Maritime Provinces. For the most part, the particular work from which this paper is based relates to projects carried out in New Brunswick and, to a limited extent, Prince Edward Island. With regard to conventional fixed-route transit systems, background operating data from a national database is utilized to provide an overview of characteristics in all small Canadian cities which currently have transit service.

**P. Eng., Director, ADI Limited.*

The comments which are contained in this paper are general in nature. However, an effort has also been made to include comments relating to a few particular projects which highlight the basic observations being made. The observations which have been assembled for this paper are what might be classified as overall observations and/or questions which have evolved from the experience on a number of projects.

The discussion for the remainder of this paper is grouped into the following categories:

1) conventional fixed-route transit systems; and,
2) vanpooling;

CONVENTIONAL FIXED-ROUTE TRANSIT SYSTEMS

The "small urban area" fixed-route systems referred to in this paper relate to municipalities with populations not greater than 100,000 people.

As an introduction to this section of the paper, it is appropriate to note that our experience has revealed a noticeable reluctance for small municipalities to implement urban transit services. This reluctance relates primarily to the hesitancy to accept the degree of financial responsibility necessary to support operation of these services.

As a result of some recent experience which reconfirmed this basic phenomenon, it seemed appropriate to explore recent national trends for some of the primary operating characteristics exhibited by transit operations in small urban areas. The result of this review are presented in several charts illustrating operating characteristics for fixed-route transit operations in the size of municipalities defined above. Before commenting specifically on the operating characteristics reviewed, it is perhaps relevant to note that this review was also at least partially precipitated out of an interest to see if the changes in energy costs over the past few years have had a noticeable impact on utilization levels for public transportation services in small urban areas. Increased fuel costs have been cited as a causal factor in several recent reports of significant increases in ridership levels on many of the transit systems in large municipalities. How-

ever, similar factual information on small urban areas was not as apparent.

Through the cooperation of the Canadian Urban Transit Association, data on several operating characteristics were obtained. This database, which incorporates all Canadian transit systems operating in municipalities with populations less than 100,000 in 1974 is summarized in Figures 1 to 4. The variables included in these respective figures are:

1) revenue-cost ratios;
2) subsidy per capita;
3) ridership per capita;
4) passengers per mile of service.

It is relevant to note that the values plotted in Figures 1 to 4 are the overall average of all transit properties operating in each respective year. Although the number of properties in the sample varies from year to year, the data is generally based on in excess of 25 to 30 properties. The information plotted covers the years from 1974 to 1980. The first year of the series, 1974, was selected because it represented the first year which might have shown an impact of the OPEC interventions in energy supply and pricing.

Considering the revenue-cost situation illustrated in Figure 1, it is apparent that there has been little change in the general level of financial performance of small transit systems during the latter portion of the 1970's. If anything, the revenue-cost ratio has deteriorated slightly over time.

Figure 2 provides a clearer indication of the real impact which must generally be borne by a municipality through the mechanism of operating subsidies. This figure is much more revealing than Figure 1 in that it clearly indicates an obvious trend for a rapidly increasing subsidy requirement to maintain the transit systems. The subsidy per capita has increased by a factor of 2.9 over the six year period. This is equivalent to about 19 percent per year which is substantially above inflation levels during the period in question. This observation is interesting on its own merit, but it is perhaps more intriguing to consider the reasons why such a change has occurred. One of the obvious difficulties inherent in treating this subsidy per capita variable independently is the fact that the relationship between ridership (hence, revenue) and level of service is not evident. That is, the subsidies may have increased at such a high rate due to a variety of reasons such as major expansions in the level of service provided by the systems. For example, service improvements may have resulted in increased route mileage which had a disproportionate increase in operating costs relative to revenue generation. This relationship is explored somewhat further in the following paragraphs.

Since revenue is a function of ridership, Figure 3 has also been included to provide an overview of recent trends in ridership per capita levels. Before commenting on this figure in terms of the general relationships contained therein, it should be noted that the data for 1980 could be somewhat misleading because several of the properties had not yet submitted their operating statistics to CUTA at the time this data was assembled. Referring to Figure 3, it is evident that from 1975 to 1978 there was a slight increase in the ridership rates over the 3 years. Obviously, this increase is little more than marginal, if in fact it is statistically significant at all. Contrary to this apparent trend, during the past 2 years there was a decrease in ridership (although it should be noted that the sample size for 1980 was only 22 properties compared to the sample sizes of 32 to 35 which was available for the earlier years).

The basic observations which can be drawn from the above comment is that if there has been an increase in ridership, it is only marginal. Furthermore, although there was a short term trend toward marginal increases in ridership levels during the mid 1970's, this is not necessarily a consistent trend. This is reflected by the noticeable drop in average ridership in 1979. These observations point out characteristics which are contrary to what might have been expected from the general increasing awareness and concern about energy costs during the period under review. This period of energy consciousness has obviously not caused a noticeable switch from the more energy intensive modes (such as the private automobile) to public transit vehicles. More explicitly, there has not been a major increase in the magnitude of average ridership rates on a per capita basis.

Although the average ridership levels illustrated in Figure 3 are meaningful it is not possible to relate the ridership levels indicated to changes in service level which might have occurred during the time period being examined. Even though there is a marginal increase in ridership during the period from 1975 to 1978, it is possible that such changes could have occurred due to reasons such as concentrated marketing efforts or major improvements in the level of service provided. No effort has been made to determine the stability of marketing efforts over this period. However, a meas-

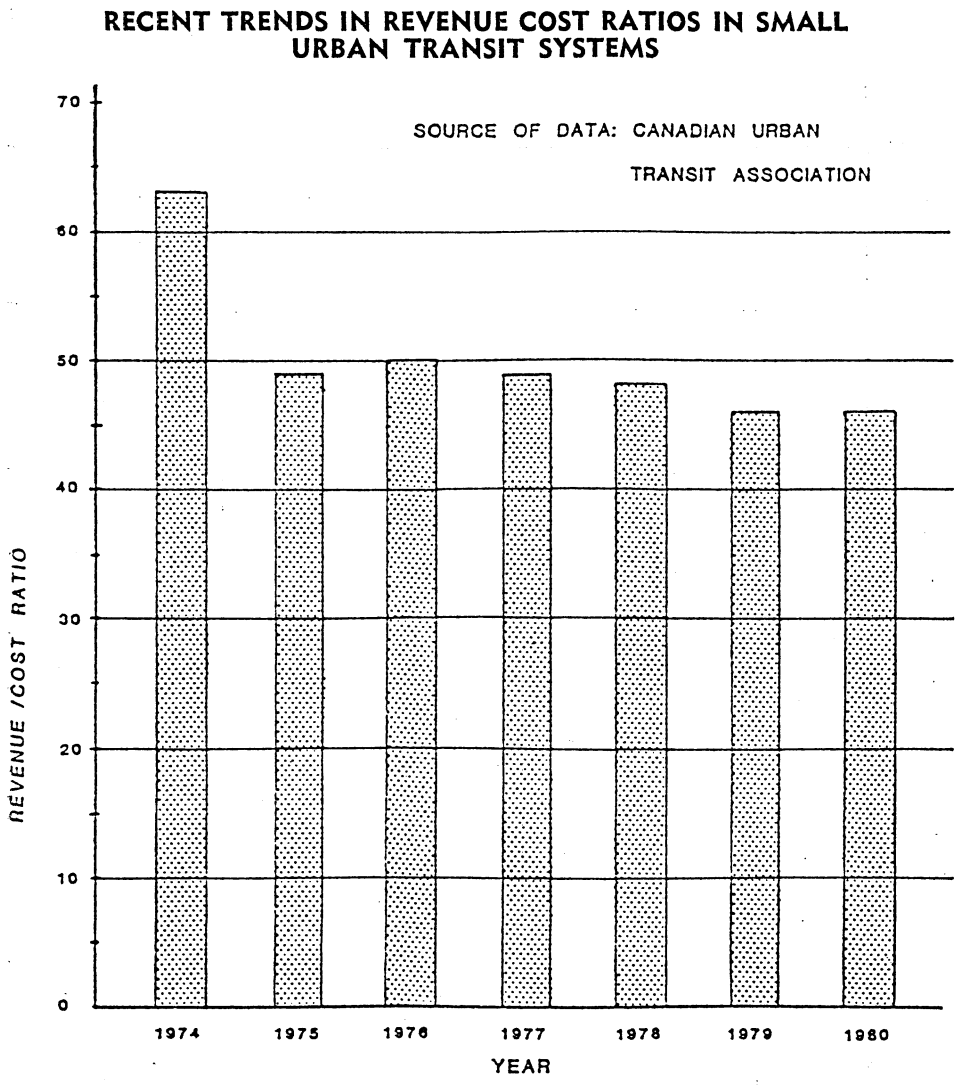

FIGURE 1

ure of service level has been derived. This effort is reflected in Figure 4 which illustrates ridership levels in relation to the amount of service provided. This variable is not by any means an all-encompassing description of quality of service, but it does give at least an indication or ridership relative to the total annual miles of service provided by the respective operating systems.

The information illustrated in Figure 4 illustrates little change in average ridership levels per mile of service provided during the period considered. The average ridership has varied from about 2.5 to 2.7 passengers per mile of service for the period from 1974 to 1978. In fact, in 1979, the average was down to about 2.3 passengers per mile of service.

Considering the information illustrated in Figures 1 to 4 it can be noted that although there has generally been a growing awareness for energy conservation since 1973/74, at least in the smaller urban areas, this has apparently not

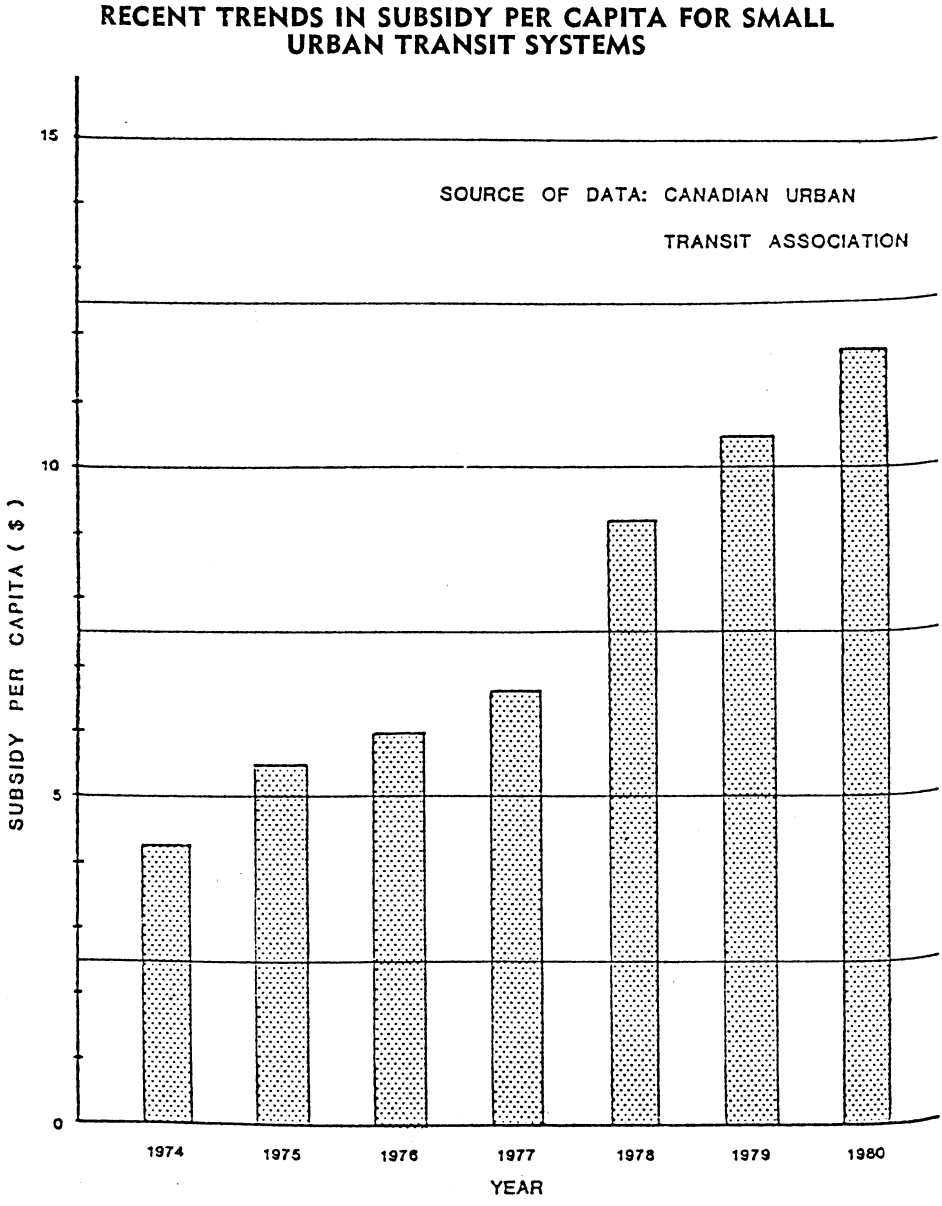

FIGURE 2

manifest itself in any significant switch away from the more energy intensive private automobiles to public transit system.

The fact that existing transit systems have not shown major changes in service levels is perhaps a contributing factor to the reluctance for many smaller municipalities to establish public transit services. The other critical factor is the sheer reluctance of municipal decision makers to embark on a venture which continues to be an obvious deficit operation. Some recent experience in New

RECENT TRENDS IN RIDERSHIP PER CAPITA FOR SMALL URBAN TRANSIT SYSTEMS

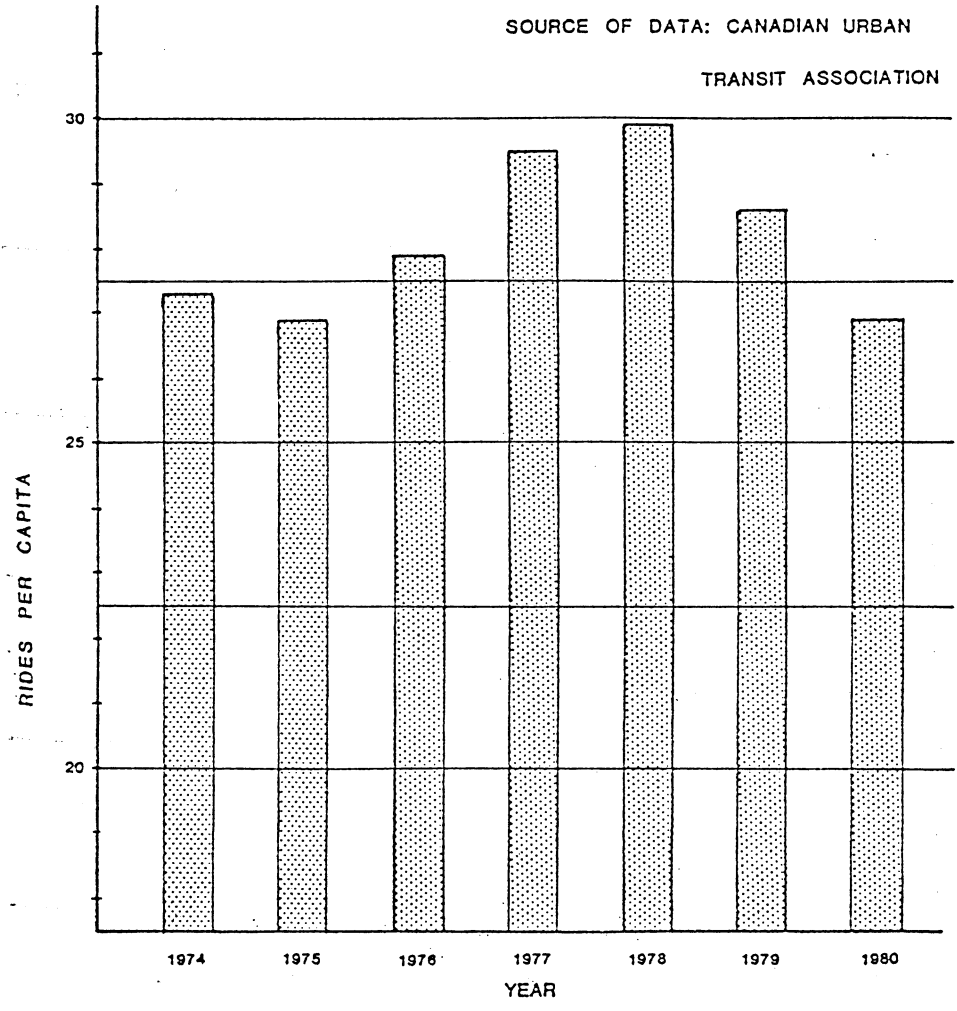

FIGURE 3

Brunswick involved developing service options and cost estimates for what might be described as bedroom communities adjacent to one of the larger cities (population = 70,000). This analysis indicated that a relatively good standard of service could be provided within this community and between the community and the primary employment and shopping areas at an annual operating subsidy level of about $5.50 per capita. This is less than one-half the Canadian average value for 1980 shown in Figure 2. Nevertheless, even though this community appeared to have a substantial degree of public support for transit service, the service has not yet been implemented. This perhaps represents the typical reluctance of municipal authorities to embark on ventures which are knowingly going to require financial support at the operational level.

The bottom line of all this discussion is that although transit service in small urban areas is generally viewed as a desirable service, municipal authorities in

RECENT TRENDS IN PASSENGERS PER MILE OF SERVICE IN SMALL URBAN TRANSIT SYSTEMS

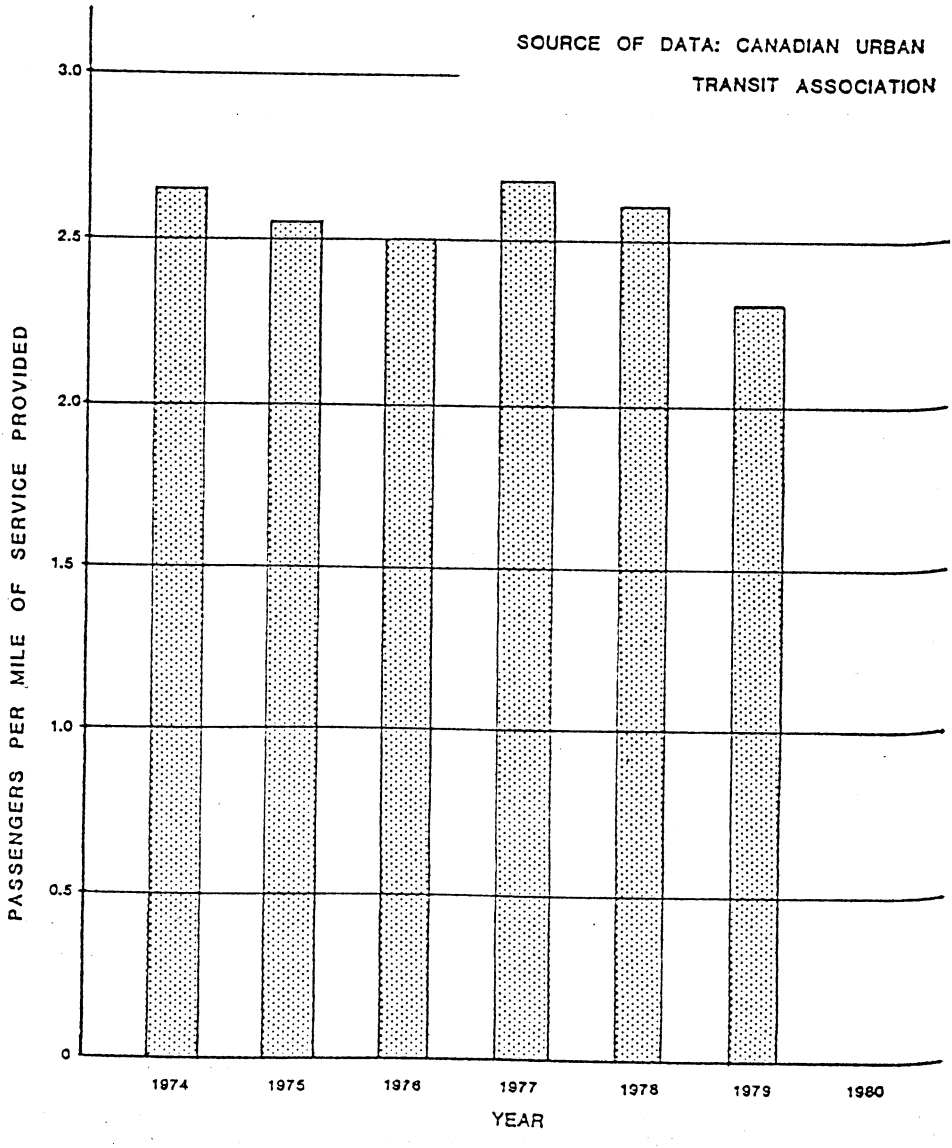

FIGURE 4

this part of the country are generally reluctant to give this type of service the priority it requires for establishment and operation. Further general observations about conventional transit systems are included in the concluding section of this paper.

VANPOOLING

The other aspect of public transportation service which has received considerable attention in the Atlantic Region is vanpooling.

As a result of the incentive provided

by the vanpooling initiatives established by the Federal Government, we were retained in 1978, by the Province of New Brunswick to select sites for possible Federal/Provincial Vanpool Demonstration projects. This program was originally viewed with substantial optimism because of anticipations regarding stimulation of a service type which was known to be already operating throughout the province without third party incentive.

The 1978 experience concentrated on vanpool site selection efforts for areas other than the larger municipalities which were already served by public transit. Initially, all industrial sites with average annual employment levels greater than 350 were selected. This was supplemented with information obtained by contact with industry representatives to determine:

1) a general description of the business and type of activity undertaken.
2) a breakdown of employees in various job classifications.
3) a breakdown of shift characteristics.
4) the extent of existing pooling.
5) the distribution of place of residence and approximate distribution of commuting distances.
6) the level of interest in pooling expressed by the employer and the employee representatives.

As a result of this initial review of potential, two sites were selected for further work directed at implementing vanpooling services. The two sites selected were both industrial locations in small communities (populations of 2000 and 7000, respectively).

Both industrial sites drew employees from a large rural area as well as the community in which the plant was located. In both cases, the industry in question was the single major employer for the immediate community, as well as the surrounding region. As an overview of the potential demand at these sites, the employment levels at the two plants were in excess of 1000 and 1200, respectively.

Subsequent to the above initial site selection efforts noted above, we were involved in further work for Transport Canada with the objective of organizing and implementing vanpools at the two industrial locations. In the final analysis, efforts at both sites (which were considered to be the sites with the highest degree of probability for success in the province) were abandoned prior to implementation. The reasons why these efforts were abandoned are not only interesting, but they reflect the reality of attempting to implement a form of public transportation service in small rural-oriented areas.

Before outlining the results of this work, it is relevant to comment briefly on the level of effort which was given to organizing these prospective vanpooling operations. The general process followed with regard to organization efforts can be outlined as:

1) discussions with and confirmation of support from the company management.
2) followup with company personnel officers to determine a number of relevant characteristics of company staff (including shift structures, place of residence and general existing travel patterns and characteristics).
3) distribution of information on vanpooling in general and this program in particular via union representatives and company bulletin boards.
4) development of plans for followup meetings with staff members who exhibited specific characteristics which were considered to be representative of at least marginally good prospects as either vanpool operators or participants (out of the entire staff of 1200 at the prime site, only 4 potential van operators were identified).
5) a special briefing meeting was held with the four prospective van operators and additional background was provided in the form of an information paper on vanpooling. This package included details on the role of driver/coordinators, various aspects of van acquisition, cost recovery fares, maintenance procedures, passenger pickup details, and future steps regarding implementation and operation.
6) subsequent to the meeting with potential operators, specific typical fares were calculated for the distances which would have been relevant to the users in question.
7) the prospective driver/coordinators attempted to solicit prospective vanpool participants from the general geographic area of their residence and/or along their route to work.
8) efforts to use the personal knowledge of the resident driver/coordinator failed to result in sufficient numbers of participants to justify a vanpool operation.
9) in light of the difficulties initially

encountered, a full scale information meeting was offered to all interested employees. Posters were distributed for notice of meeting and placed at approximately 10 key locations throughout the plant and at the employee's hall and the union building. The posters used a brochure cover designed specifically for this project. In addition, a further search was made through personnel files in an attempt to isolate individuals residing in strategic potential vanpooling locations. Approximately 70 of these parties were identified and personalized invitations sent out to them one week in advance of the meeting. Company staff felt that it would be prudent to make the letter available in both official languages and to have bilingual capability at the meeting. Both suggested courses of action were taken.

10) Chrysler of Canada Limited made a van available through their regional office. A new 12 seat van was provided for this purpose. Large posters were applied to the van and it was placed on display at the main entrance to the plant on the day before the information meeting. On the same day, company Personnel Department staff contacted several divisions in the mill to remind them of the following day's information meeting.

11) on the day of the meeting, the van was prominently positioned at the main work entrance from 7:30 a.m. - 8:30 a.m. and 11:45 a.m. - 1:15 p.m. and additional flyers containing meeting notices were distributed directly to employees entering the building on their way to work. As well, individuals were encouraged to have a look at the interior of the van. Only a limited number (10-15) of employees took advantage of this opportunity. Those who viewed the vehicle seemed impressed by the van, but were skeptical of the concept of vanpooling under the proposed framework for their particular area.

12) before the scheduled general information meeting (timed in accordance with a major shift change) flyers were placed on all cars in the main parking lot. The turnout at the meeting was very poor. The President of the major union plus two other individuals expressed interest in the project. The Demonstration Program was explained by our staff and a N.B. Department of Transportation official and assistance was offered to any individual wishing to establish a vanpool. Despite ample notification, only one of the four individuals who had originally investigated the Driver/Coordinator briefing session made an attempt to view the van and talk about the project. Because of the previous interest expressed by these particular individuals, followup letters were sent out after the meeting soliciting participation, but none were answered.

13) undistributed information packages were left with the company personnel department and some were eventually passed out to interested individuals. One additional gentleman did express some interest in the project. When first contacted by our staff, he stated that he was going to need a car anyway and thought perhaps the van option might be particularly suited to his situation. An offer to hold a meeting with interested potential passengers was made, but despite the prospective driver's optimism, only one passenger could be recruited.

14) ultimately, because of the lack of interest shown at this site (which was considered to exhibit the greatest probability for success for all industrial sites outside of the large cities in the province), it was decided, in conjunction with the Study Steering Committee, that further development work at this site was not warranted. Vanpooling organization activities were therefore discontinued.

It should be reiterated that the objective of the New Brunswick Vanpooling Demonstration Project was to establish an operating vanpool at a rural location where vanpooling did not currently exist to a major extent. Employers sufficiently large to justify consideration in this regard in New Brunswick are essentially large resource oriented manufacturers. The nature of these firms is that maximum efficiency is achieved with operating schedules that require shift work. Because of occasional requirements to work double shifts, and the temporal dispersion of shift workers throughout the day, the employees so involved do not make ideal candidates for vanpooling. Unforeseen shift work problems at one of the two prime sites contributed to the abandonment of this site from further vanpooling consideration and effectively eliminated a large

portion of the working population of the other site.

It has been observed that in rural locations (or those small urban areas which draw their employees from rural areas) the perceived social value of the automobile remains very high. This relationship is also obviously related to the general affluence of the area residents. The basic labour rates at the locations considered were relatively high. Several individuals commented that they were not interested in sacrificing the comfort and convenience of their automobile for a few dollars per week. One must also recognize the importance of the automobile to the rural individual in relation to his retail shopping preferences. The mobility afforded by his vehicle has prompted a shift in purchase of such day to day necessities as groceries and gasoline from local stores near the place of residence, to the shopping facilities of towns and cities. Individuals accustomed to this shopping pattern frequently find it difficult to abandon the convenience of their private automobile.

Those not travelling by themselves are generally members of existing carpools, many of which have been operating for some time. The low fares charged for this form of transportation also presented some problems for the vanpooling concept. At the time of the study (1979), fares of $5.00 per week for a journey of 10-12 miles were reported as typical in this area. To achieve full cost recovery, vanpooling fares for a comparable distance, under the most optimistic of circumstances, would have been approximately double this value. Given the low fares for existing carpools, prospect of establishing a vanpool under a full cost recovery fare scheme were extremely poor.

In summary, there does not appear to be one single reason for the lack of interest in vanpooling in the above cited case studies. The following items are all considered to have been contributing factors:

1) the high social value of the automobile in small urban areas and rural locations results from both convenience and necessity factors.
2) the existence of shift work and occasional double shift requirements hinder development of vanpools at resource oriented industrial sites.
3) relatively high remuneration in the resource oriented sectors results in a degree of affluence substantially high enough to allow individuals an opportunity to choose another transport alternative.
4) existing pooling operations are a common occurrence. More importantly, the fares charged for these services are at a level substantially less than those which would be required to achieve full cost recovery for the service.

The poor response to the particular vanpooling operations proposed in the locations cited does not necessarily suggest that vanpooling is an unacceptable form of commuter service in small urban areas. Projects of a similar nature have started on their own in several essentially rural environments (although it is probable their operations are not on a full cost recovery basis) and there could very well be many urban sites that would be ideal vanpooling locations. Development of these latter possibilities, particularly in service related firms or organizations, would appear to represent more promise for vanpooling.

Although the vanpooling organizational effort described above did not prove successful in the context of the original objectives which were desired, they have not been the only efforts to implement commuter pooling services in the region. The work cited is now about two years old, but the following additional brief comments relate to a more recent vanpooling program in New Brunswick. This particular program was announced by the New Brunswick Department of Transportation in late 1980. The program provides for assistance in starting up vanpools through Federal and Provincial funds available under the Canada/New Brunswick Agreement on the Development and Demonstration of Renewable Energy and Conservation Technologies. The objective of this program is to encourage the establishment of energy efficient commuter pools, using appropriate vehicles in lieu of travelling to work in a private automobile.

Although the program is relatively new and there are currently no vanpools in operation under the program, there has been substantial interest expressed by various individuals. The primary advantage of this program over the earlier one is that it does provide assistance during the initial years of service toward the vehicle lease costs. This provides an opportunity to reduce the fares charged to the users somewhat. Consequently, the need for full cost recovery through user fares is reduced. Although it is premature to comment on the success of this later program, hopefully it will prove to offer substantial incentive through an inherently lower fare structure. The other fact which continues to enhance the possibility of increasing acceptance of commuter pools is the con-

tinued rapidly increasing cost of fuel. Hopefully, the combination of these two factors, (i.e., less than 100 percent cost recovery and rapidly escalating fuel costs) will result in improved acceptance of commuter pools.

CONCLUSIONS

This paper has attempted to highlight some aspects of the reality of public transport services in small urban areas. Generally, two categories of service have been addressed: conventional fixed-route transit systems and commuter pooling operations. Discussion of conventional transit systems have purposely been limited to urban areas with less than 100,000 people. This was done intentionally to isolate those particular systems whose operational characteristics are often obscured due to assessments based on incorporating these areas with substantially larger ones.

During the past decade there has been an increasing awareness of public transport requirements. This awareness has been enhanced by a variety of programs supporting various elements of public transportation. The general consciousness of public transport has been caused, at least in part, by the dramatic increases which have occurred in fuel costs since the early 1970's. Continued increases in fuel costs are inevitable. The pattern for this price escalation for the next decade is explicitly defined in our National Energy Program anounced last fall.

Regardless of the substantial increases in fuel costs which have already occurred and the various programs which have been developed and utilized in recent years, it is extremely difficult to implement public transport services in many urban areas. Although there have been many cases of increased utilization for individual existing transit systems, in aggregate, there has not been a substantial increase in the average utilization rates for these services.

On the other hand, during the past 8 years the unit subsidy costs for these systems ($ per capita) have escalated at a rate well in excess of the inflation rate during this period (the average subsidy per capita has increased at about 19% per year). Because of increasing pressure on municipal authorities to keep costs under control, it is quite understandable that implementation of public transit systems in small urban areas is often treated with reluctance. If there are going to be significant improvements in transit utilization levels for small urban areas, it is obvious that such services will have to achieve substantially higher priority than is currently the case.

Perhaps this increased priority will be achieved as an inherent outcome of the fuel prices explicit in the National Energy Program. Alternatively, in light of the limited change in transit utilization levels to date, there may be merit, and furthermore it may well be necessary, to consider more explicit incentives through policy initiatives.

With regard to commuter pooling possibilities in small urban areas, it is evident that, as is the case for conventional transit, the market for this type of service is limited. Some of the restricting factors for this service have been outlined in the previous discussion. The major obstacle to this service is the fact that in many areas existing pooling operations are based on fares that are substantially less than those required for full cost recovery. The knowledge of such fare levels by the general public make it extremely difficult to promote systems based on full cost recovery. Some of the more recent programs which help alleviate the necessity for full cost recovery may enhance the general acceptability of pooling operations in small urban areas. Hopefully, this will encourage use of these energy conserving approaches to commuter transport.

Nevertheless, there is still substantial need for continued promotion and development of public transport services for small urban areas. These areas require specific consideration because many of the inherent factors relating to market captivity which exist in larger areas are non-existent in small urban areas. Furthermore, there are special service needs and mobility requirements in smaller areas which must be met.