PARKING SUBSIDIZATION AND TRAVEL MODE CHOICE

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SUMMARY

Using basic arithmetic it is easy to demonstrate that it is not in the motorist's financial interest to commute alone to work. Even without considering parking, the drive-alone commuter spends 10 times more for transportation (between $16 and $24 a day) than does the transit commuter.

Motorists, however, do not think like accountants. They do not count the fixed or maintenance costs of their vehicles as part of their commuting cost. They do count fuel and (when they pay for it) parking costs. For the typical commuter the cost of fuel is only slightly more than the cost of transit (about $2 a day). Parking, however, is usually subsidized $3 to $4 a day by the motorist's employer. Several empirical studies show that drive-alone commuting would be reduced by 20% or more if drivers had to pay their own parking.

It is this paper's position that what is needed is not so much a matter of subsidy removal as it is a matter of subsidy equalization. It suggests changes in tax laws and employee fringe benefits that could have similar impacts on mode choice to the ones cited. There would be less resistance to spreading the parking subsidy to all modes than there would be to its removal.

The increased traffic, due to unequal subsidies, negatively affects the whole community. It causes congestion. In Los Angeles 10% of travel time is spent waiting in traffic; by 2010 it will rise to 53%. The added traffic and the added travel time also cause pollution. Traffic reduction, rather than technological pollution control, is becoming the only means of controlling pollution as the population grows.

There are also less obvious community problems caused by the parking subsidy. The subsidy, itself, is inequitable. It goes to a select group. Those not receiving the subsidy tend to be non-white, female, and lower paid. The subsidy is a hidden tax free income transfer; as such, it disproportionately benefits the highest income brackets. This inequity is exacerbated by the tax on transit subsidies to employees.

Unequal subsidies produce an artificially high demand for motorist support services. The ones provided by government alone would add $.50 to a gallon of fuel if the motorist had to pay for them directly. Instead, the services are subsidized by the community; and other community services are sacrificed as a result.

Unequal subsidies create congestion, which elicits demands for more roads and more parking. Neither roads nor parking generate their share of tax revenue. As a result, not only do the subsidies create more government expenditure but they also deteriorate its tax base.

Finally, a fundamental community dilemma is raised by the land use and congestion demands created by unequal subsidies. About 40% of L.A.'s urban area is devoted to the exclusive use of the automobile. How much more can the community devote to it and still remain viable?

There are a variety of responses to the situation that can be taken, which are listed in the Conclusion and Recommendations section at the end of the paper. The basic recommendation is to eliminate the artificial advantage of the auto; commuters should be given a freer hand in selecting their mode of travel without the strong bias of free or highly subsidized parking.

BACKGROUND

The Existence and Extent of Subsidy.

The idea that parking subsidizes the solo-driver at the expense of other modes of transportation is not new. Starting in 1961, over a dozen empirical studies have shown that when an employer eliminates or reduces the parking subsidy there is a dramatic shift to shared-riding and transit.

Even so, the idea that free parking may be giving the automobile a decisive advantage over transit has not entered the everyday consciousness of most transportation planners. Researchers into this issue are well aware of this and have consequently tempered their findings to better fit prevailing preconceptions. This background paper will first outline the problem and then present some representative findings that parking subsidization affects modal split. It will then explore the less researched areas of 1) the extent of subsidization and 2) costs not typically included in the costs of parking, such as social costs and opportunity costs.

Parking Subsidization as a Transportation Planning Problem.

The Cost of Solo Driving, Excluding the Cost of Parking. The automobile is a very expensive mode of transport. The Hertz Corporation has estimated that the average cost per mile for a new car in 1985 ranged from 54 cents for a sub-compact to 83 cents for a standard car in Los Angeles (which has the highest cost per mile in the nation).[1] The median round-trip work-trip mileage to L.A.'s CBD is 29 miles.[2] This means that L.A.'s solo drivers expend anywhere from $15.66 to $24.07 on their daily trips to and from work. This compares unfavorably with a commuter bus pass which, if it were only used for work trips, would cost from $1.48 to $4.25 a day (with the median being close to the lower amount). Interestingly, the Hertz calculations did not include the cost of parking because of its variability.

How Commuters Figure the Costs of their Work Trips. Hertz included depreciation, insurance, license and fees, interest, maintenance and repairs, and fuel as components of the cost per mile, with the added assumptions that the car would be sold at the end of 5 years and would travel 10,000 miles per year. While some economists might adjust the mileage, the years of ownership and a few other technical assumptions about interest and other items, the basic model would be unchanged. On a purely rational basis, even without including the cost of parking, one would almost always choose transit over driving alone. Transit would be the preferred mode even if one were to share a ride with another individual. It is several times cheaper.

Commuters, however, don't think like accountants. Rather than include their annual fixed costs (depreciation, insurance, etc.) in their calculations of mileage costs they ignore them

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1 L. Smith, "Hertz '85 20-City Car Cost Study", Press Information Packet, 3/24/86.

2 Barton-Aschman Associates and Recht Hausrath & Associates, "Los Angeles CBD Employee-Employer Baseline Travel Survey", Final Report, 4/87.

as inevitable costs for a valued necessity of life. Many don't even consider the variable costs of maintenance and repair because these can't be absolutely pinpointed as being caused by the commute to work. The fuel consumed on the work trip, however, is considered a cost of the commute by almost everyone, and is the only cost considered by the majority.

In 1985 the fuel cost per mile varied between 7 and 8 cents, depending on the make of the vehicle; so the fuel cost for the average commute was between $2.03 and $2.32.[3] Considering only the fuel cost makes the solo commute competitive with Transit, especially since many people factor in speed, reliability and comfort as part of their drive-alone experience.

Why Parking Becomes Crucial. The cost of parking becomes a crucial component of the cost of the work trip, if only because it cannot be separated from the cost of commuting. It is natural, however, that most people do not count it - commuters in the U.S. tend to park free. Parking is subsidized even in congested areas where parking space is scarce and expensive; in 1986 half the drivers to L.A.'s CBD parked free or were fully reimbursed.[4] The median subsidy was between $3 and $4 a day (This median included companies that only partially reimburse, so the median was probably higher for the free parkers).[5] It is reasonable to assume that subsidized parking in L.A.'s CBD alone amounts to over $100 million a year.

Several analysts (e.g. Shoup, Wachs, Pickrell) have become attracted to charging the full price for parking as a solution to transportation problems. As the studies below indicate, full price parking diverts 20% or more of drive-alone commuters to shared driving or transit. The solution is attractive because it addresses the problem of "external costs" (pollution and congestion), and it does it in a socially constructive manner (see the **Equity** section). It allows employers to be good corporate citizens in a way that saves them money. In general, these analysts see user taxes as the most appropriate mechanisms to finance capital facilities. They have long advocated road tolls with congestion pricing as prime examples of user taxes, but they see full price parking as a reasonable substitute that is also more politically acceptable. Unlike toll taking, parking involves fewer governmental "transaction" costs, such as metering and collecting.

As a result, these analysts have recommended a variety of actions, all of which involve indirect government intervention to encourage the reduction of the subsidies to drive-alone commuters (relative to the subsidies received by other types of commuters). These recommendations include providing technical aid for setting up and coordinating ride pools, changes in building code parking requirements to encourage ride pool and transit usage, and changing the tax laws to allow tax-exempt travel allowances which may be used for parking or for transit (with the excess being pocketed if the transit mode were chosen). This last proposal recognizes the political reality that there would be less resistance to spreading the parking subsidy to all modes than there would be to its removal.

Empirical Evidence

The evidence that parking price is a decisive component of the decision to drive-alone comes from three kinds of sources. The first is the change in modal split after parking subsidies are removed or reduced. The second is a modal split comparison of matched

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3 Smith, 1986.

4 Barton-Aschman, et. al., 1987.

5 Barton-Aschman, et. al., 1987.

companies, one of which fully subsidizes parking while the other does not. The third tracks the effects of reducing subsidies to car or van pools.

Modal Splits Before and After Parking Subsidies are Removed. On April 1, 1975, the Canadian Government ended free parking for federal employees and began charging them 70% of commercial rates for comparable parking.[6] Table I shows the modal split before and after the change. Single occupant vehicles were reduced 21%.

Table I. 4/1/75 Canadian Government discontinues free parking:

Mode	Before	After	%Change
Drive Alone	34.9	27.5	-21
Carpool	10.5	10.4	-1
Transit	42.3	49.0	+16
Other	12.3	13.1	+7

The Canadian data also show that the higher the income of the employee the more likely he or she was to switch, giving credence to the argument that, as a hidden subsidy, the free parking was a greater benefit to the wealthy because it was tax free.

L.A.'s Commuter Computer, which promotes ridesharing, gradually revamped its own parking policies to be consistent with its corporate mission.[7] It originally subsidized employee parking completely ($57.50 a month per parking space). In 1976 each van pooler was offered a subsidy equal to the price of a parking space. In 1979 bus riders were offered free passes. Even so, 70% of employees still came to work alone in their autos. In 1982 the parking subsidy for drive-alone commuters was cut in half. In 1983 it was removed entirely. Table II shows the changes in modal split before, during, and after the transition from full to no subsidy. Single occupant vehicles were reduced by 79%.

Table II. Computer Computer's 1982/3 reductions in parking subsidies:

Mode	Free Parking	Partial Subsidy	Full Charge
Drive Alone	42	27	9
Carpool	17	39	58
Transit	38	34	28

The free to full charge changes were statistically significant for Drive-Alone and Carpool modes but not for Transit.

A note of caution should be sounded before accepting the Commuter Computer results. Only 66 people were affected and they may not have been representative of the general population - they worked in an environment that made them well aware of the benefits of ridesharing. The more modest Canadian results may be more representative since they involved thousands of employees.

Modal Splits of Matched Parking Facilities. In 1969 275 Federal and County workers who

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6 Transport Canada, "The Effects of the Imposition of Parking Charges on Urban Travel in Canada: Summary Report", TP 291, 2/78.

7 M. Surber, D. Shoup, and M. Wachs, "Effects of Ending Employer-Paid Parking for Solo Drivers", Transportation Research Record 957, 1984.

commuted to L.A.'s Civic Center were compared.[8] The Federal employees paid for their parking while parking was free for County employees; otherwise, the two groups were well matched in terms of sex, skill level, and income. Table III compares each group's modal split. The non-subsidized employees were 44% less likely to drive-alone to work.

Table III. Federal (Paid Parking) vs. County (Free Parking) employee modal choices:

Mode	County	Federal	%Difference
Drive Alone	72	40	- 44
Carpool	16	27	+ 69
Transit	12	33	+175

Less dramatic differences were found in a 1976 survey of employees to the Century City area, an area not as richly served by Transit.[9] Table IV compares employees who had full, partial, and no parking subsidies. The difference between the fully subsidized group and the unsubsidized group was only 18% - 92% of the Century City employees with free parking drove in alone while 75% of the unsubsidized employees did so. Note that in this less congested and less transit served area the percentage of unsubsidized drive-alone commuters was greater than the fully subsidized drive-alone drivers to downtown.

Table IV. 1976 Survey of employees in Century City area.

Mode	Free Parking	Partial Subsidy	Full Charge	% Difference between Free & Full
Drive Alone	92	85	75	- 18
Carpool	4	9	12	+200
Transit & Other	4	6	13	+225

During the initial phase of subsidy elimination Commuter Computer was matched with a control company. The control company was nearby, equal in size, equally served by transit, and provided free transit passes. It continued to provide free parking after Commuter Computer reduced its subsidy by half. Table V shows the comparable modal splits in April and December 1982, before and after Commuter Computer's subsidy reduction. In the particular months studied the control company's solo driving went up 8% but Commuter Computer's went down 56%.

Table V. 1982 Mode Splits for two Downtown L.A. Firms.

	Commuter Computer		Control Company	
Mode	Free Parking	Partial Subsidy	Free Parking	Partial Subsidy
Drive Alone	48	21	38	41
Carpool	18	43	21	21
Transit	30	36	35	32

Reducing Subsidies to Car and Van Pools. While there aren't many empirical studies focusing only on shared riding subsidies, and the ones that exist are neither sophisticated nor definitive, they form a separate category because of their peculiar findings. They tend

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8 D. H. Pickrell and D. C. Shoup, "Employer-Subsidized Parking and Work-Trip Mode Choice", Transportation Research Record 786, 1980.

9 Pickrell and Shoup, 1980.

to show that car pool incentives that are not tied to reductions in single driver subsidies will tend to pull riders from transit more than pull drivers from single occupant vehicles.

In 1974 the price of parking permits in two Seattle lots were reduced from $25 to either $5 or $0 for carpoolers.[10] 38% of the patrons taking advantage of these prices were carpoolers from other lots, 40% were transit users and 22% were single auto drivers. Bus patrons were lost but in all probability the total number of cars entering the city was reduced.

In 1986 two companies, each the principal tenants of identical 52 story office buildings in downtown L.A., were compared.[11] The companies shared the same parking area. Company A had no ridesharing program; it subsidized parking at the rate of $40 a month (employees paid $60). Company B subsidized parking for $50 a month (employees paid $50) but it also provided incentives for car pooling. It raised the subsidy to $75 for 2 person car pools, it provided free parking for 3 person carpools, it provided free bus passes for transit users, and it gave a $15 a month bonus to vanpoolers on top of their free parking. Company B's greater expenditures on both drive alone and other modes seemed to simultaneously encourage driving alone and ride sharing. The results were unanticipated but not surprising. Table VI shows the modal split for each company based on a small sample of employees surveyed. Company B had more employees car pooling, but at the expense of transit, not at the expense of driving alone.

Table VI. 1986 Mode Splits for two Downtown L.A. Firms.

	Company A	Company B
Drive Alone	49	48
Car/Vanpool	20	34
Transit	31	18

The Extent of Subsidization

The Cost of Parking. Price is often used as a proxy for a commodity's cost in economic models; but this assumes a competitive market. Both supply and demand are distorted in the market for parking.

Distorted Supply. Employer provided parking dilutes the competitive position of commercial parking. The oversupply comes from a variety of sources.

Local building codes demand that developers provide parking at specified levels (usually per 1000 sq. feet). Their ostensible object is to keep street parking and other local facilities from being overwhelmed.

Even when local codes are relaxed, as with L.A.'s 1983 Parking Management Ordinance, historical precedent - in the form of "current market practices" - influences parking space development. Developers are forced by lenders to build spaces at historic levels because they fear that lack of parking would lessen property marketability.[12] (In downtown L.A.

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10 G. K. Miller and T. Higgins, "Implementing Parking Pricing Strategies", Project Report 3161-1, The Urban Institute, 8/83.

11 M. Mehranian, M. Wachs, D. Shoup, and R. Platkin, "Parking Cost and Mode Choice Among Downtown Workers", Draft paper, 12/86.

12 D. Curry, "City of Los Angeles Parking Management Ordinance", U.M.T.A., 3/85.

the C.R.A. has taken positive steps to offset this tendency).

Providing parking space becomes either a building cost or a development cost for attracting tenants. It may be reflected in rent for office space but many times the landlord will not be able to partition out the portion of the rent that goes into the cost of parking. In 1977 the Office of the Mayor determined that the market price of parking in L.A.'s C.B.D. is only 60% of the cost of providing parking.[13]

Distorted Demand. The lure of free or partially subsidized parking is just that - a lure. As an artificially cheapened good it inflates demand. In some ways the demand has become entrenched. It has been around long enough for people to see it as a familiar, and therefore natural, part of their environment. Laws that presuppose free or cheap parking are acceded to, and substantial personal investments (in cars) are made. Since the variable costs of the investment are insubstantial compared to its fixed costs, it is in the auto owner's interest to use his or her car. Increases in variable costs, such as parking prices, will be the strongest disincentive to use. (They may also generate the strongest resistance.)

Opportunity Costs. The notion that market price does not reflect full cost is shown in the price of the land when it is being put to an alternative use. Presumably, the lower than market price for parking can be sustained because parking lots are temporary facilities on land being held for later development, or they are subsidized by rents obtained from other portions of the property.

The subsidization of parking by other portions of a property is especially strong for residential real estate. The square footage of a residential home or apartment (except for fire insurance) is calculated by excluding parking. Whether calculated for sale or for taxation the standard is to take the area of the floor minus the space allocated for parking. This, by the way, also represents a considerable property tax loss to the county.

Calculating Costs. It is surprising that many property managers cannot calculate the cost of parking since the costs for building a parking space, and operating a lot are well known.[14] In Los Angeles, surface parking will cost between $500 and $1,000 per space to build, depending on the type and depth of its paving base; an above-ground parking garage will cost between $6,000 and $11,000 per space, depending on construction materials. An underground facility could cost almost twice as much per space. Operating costs vary from $.66 to $1.50 per space per day.

If land costs were $0.00, then an average above-ground garage would have to collect $2.50 per space per day to break even in L.A.. Of course the cost of land will affect this figure. Even within the narrow confines of the C.B.D. the cost of land varies dramatically; some parking spaces cost $25,000 when the cost of land is figured in.

The building costs for a residential 1 car garage is $2,000 to $3,000; it is $3,000 to $5,000 for a 2 car garage. Again, this does not include the cost of land.

The Social Costs of Parking Subsidization.

It has never been hard to prove that the automobile is a costly, and in dense urban areas

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13 D. H. Pickrell and D. C. Shoup, "Land Use Zoning as Transportation Regulation", Transportation Research Record 786, 1980-b.

14 R. A. Weant, Parking Garage Planning and Operation, 1978; R. S. Means Co., Means Building Construction Cost Data, 1986.

an inefficient, mode of transportation that can only compete because of hidden subsidies, such as free or underpriced parking. Why be concerned? If the public wants to spend its money on a costly luxury why not let it do so?

The cause of the concern is not so much the cost or inefficiency of the auto as it is its unintended side effects. If there is any reason to subsidize something it is because that something improves the life of the community. The focus therefore should be on the community; benefits that accrue to individuals should not be subsidized, they should be paid for by those individuals. Do subsidies to the auto benefit the community or individuals? The answer is clear; individuals, not the community benefit from auto parking subsidies.

Congestion. The auto is subsidized because it is thought to mobilize the community in a way no other mode can. But does it? The most immediate concern of transportation planners is our incipient gridlock. S.C.A.G. estimates that L.A. motorists spend 10% of their travel time stuck in traffic. If both our population growth rate and our rate of single driver commuting continue then the snarls will take up 53% of travel time by 2010.[15] Planners want to eliminate the parking subsidy because it is both the easiest and most cost effective way to ameliorate the problem, but they see its elimination as only a partial solution.

Pollution. In 1986 L.A. still had the dirtiest air in the nation. The auto is the major culprit. The auto accounts for 6% of the air's particulates, 18% of its sulfur dioxide, 33% of its organic compounds, 59% of its nitrogen oxides, and 84% of its carbon monoxide.[16] Until recently, emission controls have been able to keep L.A. air from further deterioration. Population pressures make this unlikely to continue since there is no upcoming technological solution. Sulfur dioxide and nitrogen oxide levels are already getting worse. Conditions of health and air quality are correlated. This was recognized as a community concern long before the problem of congestion generated action. L.A.'s Parking Management Ordinance was framed as a pollution control, not a congestion, measure.

Resource Allocation. Even if parking subsidies to individuals did not have the noxious side effects of pollution and congestion they still would not be justified. The artificially high demand for the auto also creates a demand for support services that are paid for by the community. It is argued that highways are paid for by user fees in the form of gasoline taxes. While the argument about self-supporting highways is, itself, suspect, it misses the point that city and county services have to be geared to auto support once the auto leaves the highway.

A 1983 study of Pasadena services concluded that, within cities, user payments (fuel taxes, in lieu taxes, and traffic fines subvented by the state) fall short of support for city services provided for motorists.[17] 40% of Police department costs were auto related (motorcycle patrol, auto theft, vehicular manslaughter, parking enforcement, traffic control, accident investigation); as were 14% of Fire department alarms (auto/truck accidents, garage fires); 16.3% of Paramedic calls; 1/3 of prosecutor staff time; 13.5% of city administrative services, with a higher percentage for specific offices (Traffic Engineer, Road department).

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15 R. Riga, Speech to Long Beach Conference on Transportation, Quoted in L. A. Herald Examiner, 5/17/87.

16 R. S. Gaines, "Freeways Mean More, Not Less, Air Pollution", California Transit, 9/86.

17 S. Hart, "Huge City Subsidies for Autos, Trucks", California Transit, 9/86.

The study estimated that total auto related costs were $15.4 million while motorist contributions accounted for $3.7 million; the city subsidized the $11.4 million shortfall. This would be the equivalent to 21 cents a gallon if the users paid for the services themselves. It would be between 40 and 50 cents a gallon if county costs were thrown in. In a world of Proposition 13, and other budgetary constraints, the money helping the individual motorist has to be taken out of other community services.

Land Use. The artificial demand for autos not only drains city and county revenue, but it also eliminates the revenue itself. About 15% of L.A.'s urban area is devoted to parking, much of which is not taxed.[18] The figure becomes 40% when private rights of way, roads, and highways are added.[19] Again, these add little to the city's property tax rolls.

The loss of tax revenue is ancillary to a more fundamental land use issue: How much more can the area lose to the sole use of the auto and still remain a viable community, much less an enjoyable one?

Equity. Auto subsidies do not benefit the community so much as they benefit individual motorists. The people benefiting from parking subsidies constitute an even smaller subset of the community population. Employer parking subsidies are inequitable insofar as they fail to benefit either unsubsidized motorists or those who commute by other modes.

The parking subsidy is a benefit that has a tendency to go to the group that needs it least: white, male, and affluent. In L.A.'s C.B.D. the archetypal company with a heavy parking subsidy resides west of Broadway, with 3 or 4 workers per 1000 square feet. Companies east of Main may have twice or more workers per 1000 square feet and no parking subsidy. These are not privileged, high income, workers. They depend heavily on public transit. A 1986 C.R.A. employee survey verifies the finding that the transit user group contains a disproportionate share of low-income earners, minorities, and women.[20] Other studies show that up to 3 times as many nonwhites as whites travel to work by public transit.[21]

In many respects subsidized parking is a tax free income transfer to employees. As such it works overtime for those in the higher tax brackets. Federal tax regulations discourage extending the benefit to transit users. Any cash transfer over $15 will be subject to taxation. Provision of bus passes is considered a cash transfer but parking provision is not. The community would benefit from a more consistent policy, either by taxing the parking subsidy or not taxing the transit subsidy.

CONCLUSION AND RECOMMENDATIONS

It is becoming increasingly apparent that urban congestion and its concomitant problems cannot be solved until the subsidy bias toward the automobile is removed. The auto will continue to clog urban arteries as long as it retains its unfair advantage through artificial support. Removal of the parking subsidy advantage is no panacea, but it is the least costly of available options, and it will probably have the greatest effect. This unwise and unfair advantage can best be removed if the parking subsidy is spread to all modes so the

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18 Wilbur Smith and Associates, Parking in the City Center, 1965.

19 S. Hart, "The Sierra Club Responds to the Automobile Club", Unpublished paper, 4/87.

20 Barton-Aschman, et. al., 1987.

21 Pickrell and Shoup, 1980.

commuter has a freer hand in choosing the mode of travel that makes the most sense for him or her and for the community.

What should the community, and particularly, the political and business leadership of the community, do? Advocacy of a balanced metropolitan transportation system will be appropriate. A component of such advocacy is the spread of the auto subsidy to all modes (or its elimination). In this broader community role, community leaders could:

- Mount an aggressive public information program that demonstrates all of the costs of using a car.

- Government agencies, such as RTD, could offer support services to employers, such as customized route information and pass sales liaison. They could market these services in the same terms as those presented in the paper: By equalizing auto and transit subsidies, an employer becomes a good corporate citizen without costing himself and his employees money.

- Hold public forums, such as a one-day conference on parking issues, co-sponsored by public agencies and the private sector.

- Form an alliance among local and regional bodies that are aware of the issues of congestion and pollution, and are already working on parking related solutions. These solutions are not always formulated with an understanding of the roots of these problems. RTD's insights could be beneficial.

- Evaluate and advocate modifications to local building codes and ordinances that affect parking. For example, it might be legally possible to require commercial and residential properties to separate their charges for parking and office or living space. Making the rental of parking optional would lower the overall rent of some of our transit dependent patrons; it would certainly underscore the cost of parking to everyone.

- Recognize that transit users are a class of responsible citizens that bear an unfair burden placed on them by auto users. Disseminating information on who benefits from parking would be a first step.

- Change tax laws that presently encourage employee parking benefits but discourage analogous transit benefits. Mayor Bradley's recent recommendations are a step in this direction and should be supported.