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# **Transportation and Energy: Some Current Myths**

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TRANSPORTATION AND ENERGY:  
SOME CURRENT MYTHS

A number of current assumptions about transportation and energy have acquired mythical status, because they seem self-evidently true and hence are rarely examined. Taken as wisdom, these myths form the basis for much proposed reform of transportation policy. They appeared in speeches by most of the candidates for the 1976 presidential nomination and are now echoing in Congress as well. Most of the myths I examine here concern urban passenger transportation: "Good transit systems can attract people out of cars, save our scarce energy resources, decrease private automobile ownership, be more economical than cars." Another of these myths concerns freight transportation: "Federal highway subsidies have been responsible for the shift of freight from railroads to trucks and the consequent problems of the railroad industry." And one concerns the supposed economies of railroad passenger operations.

Belief in these myths has not been confined to the political world: ten years ago, it was almost universal among even city planners and academics (including me). Thus another function of this article is to summarize what has been learned in transportation research in recent years. In the course of discussing these myths I try to point out some areas where changes in federal policy might make a difference in solving our transportation problems.

*The research discussed in this paper was begun while I was employed by Charles River Associates, Cambridge, Massachusetts. I owe an enormous debt to the intellectual stimulation from my colleagues there, but the views in this paper do not necessarily represent them. None of this work could have been done without the encouragement and support of Harrison Campbell.*

### Myth 1:

#### "Good Public Transportation Can Attract People Out of Cars"

This myth combines a fundamental truth with a bit of wishful thinking: the true part is the perception that greater use of public transportation would solve many of our most pressing urban problems; then, since this seems to be the only solution, planners go on to assume that greater use of public transportation can, in fact, be accomplished--somehow. So we have policy dictated out of wish fulfillment. But how easy is it to produce greater use of transit? It is instructive to examine this question as a potential user choosing between transit and one's own car: transit is not as fast, door to door; transit does not depart from one's home, nor does it go directly to one's destination; transit is not immediately available the moment one wishes to leave, night or day; transit often cannot provide one seat at all, much less a private, uncrowded seat; and transit offers less personal security. This is a formidable list of disadvantages, with only a single compensating factor to offset them--transit is cheaper to use. We should not then be surprised to learn that transit is used for only 2.5 percent of urban travel in the United States. We also gain some perspective on the long-term decline in use of transit: transit is inferior to the automobile along every dimension except cost; hence, as user incomes rise over time and people decide to spend part of their new income to buy a superior form of transportation, transit patronage must decline. That is, you cannot continue to sell a cheap substitute when income trends are making the real thing affordable to more and more people.

A great deal of research has been done on what determines the choice of transportation mode (e.g., bus versus auto) by urban passengers. These studies use statistical procedures to estimate commuters' sensitivity to the various factors involved in the mode-choice decision, and hence calculate the potential reaction of commuters to possible transit improvements such as lower fares, faster speeds, and more frequent service. It is fair to say that these studies have not indicated much commuter sensitivity to cost, the only factor in which public transportation has any possibility of comparative advantage. Lest this body of research be dismissed as somehow inadequate, or auto-biased, it

should be pointed out that a number of observable real-world phenomena confirm the public's aversion to "public" transportation: (a) even in cities with good public transportation, only a small proportion of the population uses it; (b) very little diversion of people onto transit occurred during the OPEC (Organization of Petroleum Exporting Countries) gasoline crises; and (c) even in European cities with excellent transit and long traditions of transit use, as family incomes have risen over time, transit use has declined and auto use has increased.<sup>1</sup> Nor have higher gasoline prices significantly affected auto travel; both computed gasoline price elasticities and observed travel behavior have shown little movement of people from autos to transit.<sup>2</sup> This has also been true for other kinds of price-diversion policies, such as increased parking charges and increased bridge tolls.

One may reasonably object that all these results apply only to current systems and that somehow "improved" transit could work. The Urban Mass Transportation Administration (UMTA) of the U.S. Department of Transportation was organized with this idea in mind, and has devoted fifteen years and \$6.5 billion to conducting experiments with transit improvements around the United States.<sup>3</sup> These experiments have not been narrowly conceived. Any community with an idea for improving its transit service can apply to

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1. For the effect of OPEC on transit use, see Mary Stearns, "Social Impacts of the Energy Shortage," mimeographed (Cambridge, Mass.: U.S. Department of Transportation, Transportation Research Center, April 1975). On income and transit use, see B. Bruce-Briggs, "Gasoline Prices and the Suburban Way of Life," The Public Interest, no.37 (Fall 1974): 131-36.

2. U.S., Federal Energy Administration, Energy Impact of Federal Capital Grants Programs for Transportation, prepared by Charles River Associates (1976).

3. The original legislation was the Urban Mass Transportation Act of 1964, and UMTA was formally created in 1968. The funding estimates come from B. Bruce-Briggs, The War Against the Automobile (New York: E. P. Dutton, 1977), p. 170.

UMTA and is likely to receive funding. The diversity of the resulting demonstration projects has been very broad; they have experimented with new vehicles, more frequent scheduling, lower fares (down to zero), more advertising, more coordination between lines, more public information, and so forth. Grants have been available to subsidize operating costs, capital costs, and training and administrative costs.

An excellent, highly readable evaluation of the UMTA program by George Hilton is worth citing at length. At the start of the program in 1963 about 8 billion transit trips were made per year. By 1972 this had fallen to 5.3 billion trips, despite all the UMTA grants and experiments. This drop in transit use was distributed over the entire nation, and every major metropolitan area suffered a decline in the number of transit trips (relative to auto trips). According to Hilton, demonstration projects on existing technology have been uniformly unsuccessful . . . . None of the new technology which UMTA attempted to produce proved an economic alternative to existing forms of urban transportation. . . . [Furthermore,] investment in rail rapid transit systems is not an effective way of reducing automobile usage. . . . Even to say that [rail transit's] ability to divert drivers is imperceptible. . . . overstates [its] positive effect on road use."<sup>4</sup>

The new rail systems can serve to concentrate economic activity in downtown areas, but this will actually increase the city's problems. When new high-rise office buildings are encouraged by a new transit line, only a fraction of their personnel will actually commute by transit; the rest will commute by auto. Hence, "building rapid transit systems probably tends on the whole to increase traffic congestion and to concentrate output of pollutants."<sup>5</sup>

The financial operation of the systems causes additional problems. The systems do not even try to repay their enormous capital costs; they hope only to pay their variable (operating) costs. But even here they have been

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4. George Hilton, Federal Transit Subsidies: The Urban Mass Transportation Assistance Program (Washington, D.C.: American Enterprise Institute for Public Policy Research, 1974), pp. 99-100.

5. Ibid., p. 101.

a failure, and these subsidies are inherently regressive: the entire population of a metropolitan area pays the subsidy cost so that commuters from the suburbs may have cheaper fares. Furthermore, using part of the Highway Trust Fund for transit, as has been proposed, would also cause a regressive redistribution of income. "The economics of the transit industry are not, as often stated, 'unique' or 'peculiar,'" says Hilton. "Rather they are very ordinary: the industry has simply been failing a market test over a long period, beginning after World War I."<sup>6</sup>

We may fervently desire that people leave their cars and switch to public transportation in order to reduce fuel consumption, congestion, and pollution. But we must recognize that nothing in the way of pure research, applied research, actual demonstrations of transit improvements, or historical evidence justifies any expectation that such a diversion can be accomplished.

#### Myth 2: "Public Transportation Saves Energy"

Examination of this myth reveals a surprising fact: the new generation of transit systems appears to waste energy. Yet these new systems are receiving a great deal of public interest around the United States. Glamorous new rail transit systems have recently opened (San Francisco and Washington, D.C.), or are in construction (Baltimore and Atlanta), or are proposed for construction (seemingly everywhere). Their costs are astronomical: the system rejected by Los Angeles voters in 1976 promised to be the largest public works program of all time. Their effects on congestion and pollution are either very small or actually negative. And the amount of subsidy the transit systems require is startling: the Bay Area Rapid Transit (BART) system in San Francisco currently subsidizes its passengers by about \$12 per round trip; the newly opened section of the Washington METRO system subsidizes its passengers by \$22 per round trip (although this figure is supposed to drop when the entire system is opened).<sup>7</sup>

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6. Ibid., p. 111.

7. Peat, Marwick, Mitchell, "Transportation and Travel Impacts of BART," mimeographed, prepared for the U.S. Department of Transportation, Contract DOT-OS-30176 (San Francisco, 1976), p. 174.

Such facts hardly encourage the building of more rail transit systems. But fortunately--for the downtown property owners, who are the principal beneficiaries of these systems--OPEC came riding to the rescue. We now have an energy crunch, and it is argued that anything that saves energy, no matter what the dollar cost, is good and should be promoted. Therefore, since it seems self-evident that these rail transit systems save energy, they should be built.

But does rail transit save energy? To answer this question, begin by distinguishing between the energy used to operate a system and the energy used to construct a system. Modern rail systems do use somewhat less energy per passenger mile than the average automobile for their daily operation. However, the amount of energy used to construct these rail systems is enormous, and completely dominates the daily energy savings.

An investment of 164 trillion Btu. (British thermal units) of energy was required to construct the BART system. As a return on this investment, enough people are attracted from cars and buses to reduce the need for highways by about forty-seven lane-miles. Unfortunately, the amount of energy saved by not building those forty-seven lane-miles is only about 3 percent of the energy invested in BART, so the offsetting effects on energy investment are trivial. Even doubling or quadrupling BART's patronage would still produce no significant offsetting effect on the net energy invested in the system.<sup>8</sup>

This is a surprising result worth restating. In terms of the initial energy investment in construction, thirty-four times more energy was required to build BART's rail facilities than would have been required to build highway facilities to transport an equivalent number of people.<sup>9</sup>

What about the savings in daily operating energy? We find that BART's

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8. Details of the calculations in this section are contained in Charles Lave, "Rail Rapid Transit: The Modern Way to Waste Energy" (Paper presented at the Fifty-sixth Annual Meeting of the Transportation Research Board, Washington, D.C., 1977), which will appear in Transportation Research Record 648 (Summer 1978).

9. Some planners would argue that this ratio should be recomputed under the assumption of 100 percent transit load factors. No transit system has ever come even remotely close to such efficiency, however, and the discussion of "Myth 1" above shows that using the actual, observed transit data is far more reasonable.



energy efficiency is between that of the bus and the car. Hence every time BART draws a user from a car we save energy, but every time it draws a user away from a bus we lose energy. Since only 46.5 percent of BART's passengers come from cars, the net energy saving is small, only 680 Btu. per passenger mile. Given BART's patronage (130,000 trips of 13-mile average length per day), we can calculate how long it will take to save enough energy to repay its construction cost. The answer is 535 years. (And this figure is not sensitive to current assumptions about patronage: let us assume that somehow BART can double its patronage, divert 75 percent of its passengers from cars, and operate at a 50 percent load factor--three impossible improvements at the same time. Even in such a transit Nirvana, BART would still take 168 years of operation to earn back its original energy investment.)

In summary, the amount of energy invested in constructing BART is so large, and the operating-energy savings so small, that BART will require 535 years to break even on its investment, much less save any energy.

If energy saving were its main rationale, BART should never have been built in the first place. Furthermore, because they compare BART to a car that gets 14 mpg (miles per gallon), these figures are strongly biased toward the effectiveness of rail transit. Congress has already mandated an average auto fuel efficiency of 27.5 mpg by 1985, and such a car is actually 15 percent more energy-efficient than BART.

Is it meaningful to generalize from this one example to other modern rail systems? Three critical figures are involved: a system's building costs, its patronage, and its energy consumption. Taking these in order, and using all the available comparative data, we find that BART's average cost per system-mile is 7 percent lower than the equivalent averages of the systems now being built in Atlanta, Baltimore, and Washington, D.C.; (b) BART draws 15 percent more of its passengers from cars than the average of the Boston MBTA (Metropolitan Boston Transit Authority) South Shore Extension and of the Philadelphia Lindenwold Line; (c) BART's operating energy consumption is 14 percent lower than that of the Lindenwold Line. Since the available statistics on other rail systems are somewhat fragmentary, we cannot make a more detailed comparison than this; but it does seem clear that to the extent that BART is atypical of modern rail systems, it is

atypically efficient. A recent study of the Lindenwold Line concluded the the system probably wastes energy on current account.<sup>10</sup> My own analysis of six proposed high-density, central business district rail systems shows that they also waste energy on current account.<sup>11</sup> That is, for all seven of these modern rail systems, the current operating energy is greater than the energy used by the combination of modes that systems replace, even without taking into account the enormous amount of energy invested in their construction.

These surprising results are apparently not an isolated example of energy waste due to mass transit. According to the 1974 National Transportation Report, planned expenditures on transit by the fifty states over the next fifteen years totaled \$61 billion and would divert about 1 percent of current auto users onto transit.<sup>12</sup> Applying the same evaluation procedure as above, 176 years would be required to save enough daily operating energy to repay the energy used in constructing these proposed improvements. And, again, we should notice that these are very generous estimates, both because they are based on comparison with a 14-mpg car and because the state-supplied passenger-diversion figures have been notoriously optimistic in the past.

In fact, projections regarding the transit systems are overstated. The "engineering" studies put together to sell a transit system to community voters generally manage both to overstate the number of passengers the system can attract and to understate the cost of building it. BART again provides an interesting example of the contrast between such forecasts and reality: it incurred almost twice the building costs, draws less than half the passengers, and uses double the energy forecast. The system that was projected to "make a major impact on traffic" actually carries only 2 percent of the trips in its patronage area.

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10. D.D. Boyce and K. Nguyen, "Energy Consumption and cost of the Journey to work with and without a Suburban Rapid Transit Line" (Paper delivered at the Fifty-seventh Annual Meeting of the Transportation Research Board, Washington, D.C., January 1978).

11. Charles Lave, "Downtown People Movers and Energy" (Paper delivered at the Fifty-seventh Annual Meeting of the Transportation Research Board, Washington, D.C., January 1978).

12. U.S., Department of Transportation, 1974 National Transportation Report (Washington, D.C.: Government Printing Office, 1975), p. xi.

The Washington METRO system provides another example of the rosy forecast used to sell transit systems. It has already vastly exceeded its forecast costs, and it is not yet completed. But its projected patronage seems to be even farther from reality than its projected costs. The METRO system is 38 percent larger than BART, and the population it will serve is 73 percent larger, but Washington travel-corridors are far more dispersed than those in San Francisco. On balance we might expect METRO to attract slightly more patronage than BART, perhaps even two to three times as much. But the forecasts used to sell the METRO system fantasize that it will have eleven times as much patronage!

I apply these comments only to the new rail systems that have been built, or proposed, in the United States. I am not saying that the older rail systems, built in extremely dense areas such as Manhattan, are inefficient; but all the high-density sites have long since acquired their necessary subways. The remaining cities without subways simply do not have enough concentrated demand to support efficient rail systems; but these cities can support bus systems, and buses do use less operating energy than either cars or the new generation of rail transit. The problem, of course, is how to increase bus patronage.

Myth 3: "Public Transportation Will Decrease  
Private Automobile Ownership"

One of the claims made in defense of modern transit systems is that they will make it unnecessary for people to buy "second" cars, and hence save the energy used to build and operate those cars. Experience with BART contradicts this idea. BART passengers are a mixture of people who formerly used bus or car. Automobile ownership among current bus users is 1.50 cars per household; among current auto drivers, 1.93. Since BART's passengers come from both types of people, the average number of cars per BART household should be between these two--and very close to 1.50, if use of BART really does reduce the ownership of second cars. But in fact the average number of cars per current BART household is 1.72.<sup>13</sup>

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13. Peat, Marwick, Mitchell, "Impacts of BART," p. 110.

This is actually slightly higher than a weighted average of cars owned by former bus and driver households; hence there is no evidence of decreased auto ownership resulting from increased transit use.

This finding may seem more plausible if we look at the purposes behind auto trips and transit trips. Transit is used mainly for commuting and is not used for other purposes because it is not appropriate for them: shopping trips demand the capacity to carry packages; recreational trips tend to have destinations not served by transit and often involve the whole family, hence presenting the alternatives of many transit fares or the cost of gasoline used by a single car; and social trips tend to be made in the evening when transit service is infrequent and have destinations hard to reach via transit. On the other hand, autos receive most of their use in noncommuting trips: only about 40 percent of the average car's yearly mileage is associated with commuting.<sup>14</sup> Thus one should not be surprised if a family that switches its commuting trips to transit still retains cars for its non-work trips.

#### Myth 4: "Public Transportation Is More Economical Than Cars"

These findings are the most depressing of any discussed here, for they imply that transit's costs are so high as to make it unlikely that transit has any significant future. Transit is simply much more expensive than our intuitive estimates would indicate: on the average, transit costs about two-thirds more per passenger-mile than the private automobile (including all capital and operating costs for the car), but to be attractive to patrons it must charge them less than they would spend by car.<sup>15</sup>

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14. Oak Ridge National Laboratory, Transportation Energy Conservation Data Book, 2d ed., prepared for the U.S. Department of Energy (Oak Ridge, Tenn., 1977).

15. Allen Altshuler, "The Decision Making Environment of Urban Transportation," Public Policy, 25, no. 2 (Spring 1977): 171-204.

That is, transit services are far more expensive to produce than car services, but they earn much less money. The end result has to be enormous deficits: in 1975 the total deficit for transit in the United States was \$1.7 billion, and that deficit has been increasing at an average rate of 59 percent per year since 1968.

Why are transit costs so high? Labor is the major expense (80 percent of total costs) in transit systems; transit unions are in a monopoly position with regard to a vital service, and the normal discipline of the market is vitiated by the willingness of UMTA to provide the necessary subsidies. For example, bus drivers in San Francisco recently rejected, as too small, a pay package that averaged \$25,000 per year.

These high labor costs lead to a high unit cost for providing the service. The marginal operating cost of the major rail transit systems (even treating capital costs as sunk, and hence free) is about ten cents per passenger-mile; and this is true for both the traditional systems like New York and the modern systems like BART.<sup>16</sup> (Since BART was designed to minimize marginal operating cost through substitution of capital for labor, this is especially significant.) That is, their marginal costs are actually greater than those for the automobile. If we include capital costs as well, the comparison becomes even more surprising--for example, the \$12.00 average subsidy of a round trip on BART, which includes an operating subsidy of \$2.62 and a capital subsidy of \$9.44, assuming 7 percent opportunity cost of capital.

Of course these high unit operating costs imply high deficits. In Boston only 25 percent of transit expenses are covered by fares--that is, there is a 75 percent subsidy. In California as a whole the subsidy is about 60 percent. In New York, the estimated deficit for 1976-77 was about \$350 million.

To understand the economics of public transportation, one must try to understand why we have \$10,000/year taxpayers subsidizing \$25,000/year bus drivers. It is difficult to see much future for transit in the face of numbers like these.

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16. Peat, Marwick, Mitchell, "Impacts of BART," p. 168.

Furthermore, expansion will not, as some have predicted, make transit significantly more efficient. Economies of scale are possible in rail transit, but rail systems are feasible in only a few cities, and even when they are designed for minimum operating cost, as in San Francisco, their marginal costs are still too high to be covered by fares. Bus systems are the most flexible, the easiest to expand, and would be the best hope for increasing transit service in most cities, but there are no economies of scale in the provision of bus service.<sup>17</sup>

In summary, transit's current share of travel is only 2.5 percent, but transit requires a subsidy of \$1.7 billion to accommodate even the tiny number of people it serves. The unit cost of providing transit services is already too high, and it cannot be reduced. This cost structure has grim implications for the future of transit. At best, taxpayers may agree to meet the increasing cost of maintaining the current level of service; expansion to accommodate a significant amount of urban travel seems highly unlikely.

Myth 5: "The Decline of the Railroads is Due to Federal Subsidies of the Trucking Industry"

Seventy-five years ago railroads carried all the overland freight in the United States; today they carry only 38 percent of it. One of the most widely believed explanations for this decline holds that trucks have been able to win a disproportionate share of the freight because their rates are artificially low: railroads must pay for their own roadbeds, but trucks have the use of a cheap roadway provided by Federal highway subsidies.

Is there such a trucking subsidy? One of the earliest academic studies of this question concluded that trucks in general pay about as much in taxes as they incur in highway building costs.<sup>18</sup>

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17. California, "Economic Role of the State in Transportation" prepared for the State Transportation Board by Randall Pozdena and Paul McElhiney (Sacramento, 1976).

18. John Meyer et al., The Economics of Competition in the Transportation Industries (Cambridge, Mass.: Harvard University Press, 1960).

The railroads have of course maintained that is not true: the United States Railroad Association (USRA) estimates that a diesel semi-trailer of five or more axles actually causes highway costs of about 1.6 cents per mile more than the taxes it pays. USRA admits that the magnitude of the figure is subject to some controversy, but I will use it for the moment anyway. Is 1.6 cents per mile an important subsidy? Using a conservative estimate of \$1.40 revenue per truck-mile, the subsidy amounts to only 1.1 percent of truck tariffs. It is difficult to see how an alleged 1.1 percent price subsidy could cause a diversion of freight from railroads to trucks.

If trucking is not receiving a significant subsidy, and hence charging artificially low prices, what does explain the diversion of freight from railroads to trucks? The first thing to notice here is that the decline of the railroad freight business began long before there was any significant federal highway program, and we need look no farther than the method of pricing freight to see why this happened. In the early years of railroading, freight tariffs were set on the value-of-service principle: shippers of expensive manufactured goods could afford to pay high tariffs, so the railroads charged them high tariffs; shippers of inexpensive bulk goods could afford only low tariffs, so their fees were set low. In essence the railroads based their rates on the value of the service to the shipper--i.e., the shipper's ability to pay--rather than on the cost of moving the goods. So a manufacturer paid much more for a ton-mile of service than a farmer and provided a greater share of the railroad's profits. When the U.S. Interstate Commerce Commission (ICC) was created, it institutionalized this value-of-service concept. During the years when railroads were the only source of transportation, the relative exploitation of manufacturers worked to the advantage of the railroads. But this gap between the cost of providing freight service and its sale price was also a tempting opportunity waiting to be exploited by some new form of shipping--which the trucking industry was the first to realize.

Even though it cost trucks more than it cost railroads to move a ton-mile of freight, the truck's costs were still lower than the artificially high prices charged manufacturers by the railroads. Trucks could provide better service--faster delivery with greater flexibility --at the same price as the railroads. Thus, to compensate for the relative difference in the quality of services, the ICC regulations that had once worked to the advantage of the railroads now prevented them from lowering their tariffs in order to charge lower rates than trucks. Naturally the trucking industry prospered and grew, and as a "reward" for its dynamic economic behavior it was eventually placed under the control of the ICC.

Once the trucking industry was under ICC regulation it, in turn, became vulnerable to simple competition. Ironically, the same ICC regulation that previously had helped the trucking industry then provided the profit opportunity encouraging private, nonregulated trucks. Under the ICC regulation, the common-carrier trucks had the same value-of-service pricing as the railroads; thus they also were overcharging high-value goods. It was not long before some manufacturers made the simple calculations to discover that they could operate their own trucking fleets for less money than the artificially high tariffs they were paying the common-carrier trucks--even though their private trucks generally had to return home empty. So private trucking prospered and now accounts for 56 percent of the intercity truck freight.

Unfortunately the ICC was not content to limit its interference to tariff schedules, but also began making direct allocations of freight runs. Thus, for example, it licensed a particular common-carrier to haul one commodity, frozen hush puppies, between a few specific cities: no other commodity, no other cities. A truck could not pick up additional cargo as it dropped off part-loads on its outbound trip, and on the way back it returned empty. Obviously such practices were inefficient and cost the freight companies money, but the ICC was not bothered by inefficiency (only by competition, apparently). The ICC simply allowed the freight companies to raise prices so that they could survive despite



their inefficient use of resources. Thus everyone pays higher freight prices to satisfy the ICC's goal that these empty trucks be kept profitable. A number of economists have estimated that the net effect of ICC regulation is an enormous underutilization of capacity: only about half of the total capacity of all railroads, common-carrier trucks, and private trucks is being utilized.

A great deal of evidence suggests that inefficient use of transportation resources, due to ICC regulation, is the major problem faced by the freight sector of the American transportation industry. These regulations cause a complex web of cross-subsidization that misallocates traffic across modes and produces underutilization of capacity within modes. Thomas G. Moore estimated that the economic cost of ICC interference was \$3.6-6.9 billion in 1971, and obviously it is even higher today.<sup>19</sup> About one-quarter of the income generated in transportation is simply wasted (and we all help pay to keep those empty trucks and idle box cars profitable). As George Hilton notes, the transportation industry "attracts unspecialized resources from other activities and wastes them in idleness, underutilization and inappropriate uses."<sup>20</sup>

We can now see the reasons for the railroads' decline, and they have nothing to do with alleged highway subsidies. The ICC's value-of-service method of rate setting has become unworkable in the transportation industry because those shippers who have the greatest ability to pay, the high-value industries, also have the most alternatives to railroad transportation. At the same time, the excess that must be charged these high-value shippers has gotten larger and larger as the railroads have acquired an increasing burden of nonprofitable services, such as rail-passenger, low-density spur line, and small-lot traffic. Meanwhile, prices of the bulk, low-value goods could be increased because of the

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19. In testimony before the U.S. Senate. See U.S., Congress, Senate, Congressional Record, 92d Cong., 1st sess., 28 September 1971, pp. 33607-18.

20. George Hilton, "The Costs to the Economy of the Interstate Commerce Commission," in Transportation Subsidies, pt. 6, prepared for the Joint Economic Committee of the U.S. Congress, 93rd Cong., 1st sess. (Washington, D.C.: Government Printing Office, 1973), p. 732.

political power associated with these commodities (farmers and mineral interests), and because shipping costs affect demand in these commodities so much more. Thus, over time, the railroads became burdened with many unprofitable services and could not raise tariffs on the bulk commodities; every time they raised tariffs on the high-value commodities they drove more and more of that business away.

Since the conventional wisdom is that the decline of the railroads is due to highway subsidies, we now have proposals in Congress to give "compensating" subsidies to the railroads, either to upgrade their track or to provide them with new rolling stock. But if the above analysis is correct, such grants will have little effect on the economic viability of the railroads. After all, the railroads were losing business back when they still had a sound physical plant and before significant federal expenditures on highways. Likewise all the current proposals to allow railroads to abandon unprofitable services and reduce track mileage could not really do much. They would increase the short-term profitability of the railroads; but if ICC interference is allowed to continue, freight will continue to be lost to trucks regardless of increased railroad profitability, and the enormous waste of resources in all modes will continue. Hence the most effective federal policy for achieving better allocation of transportation resources, reduced energy use, and increased railroad profitability would actually involve no cost to the government. All we have to do is get the government out of the regulation business.

#### Myth 6: "Railroads Can Provide Economical Passenger Service"

The myth runs something like this: "Railroads can make passenger service viable if they wish to; the figures the railroads provide about their passenger-service losses are phony and result from attributing too much right-of-way cost to passengers and not enough to freight." Unfortunately, recent events have tended to back up the railroads' claims, and it appears that their reported losses on passenger service were an accurate reflection of the difficulty of providing economic passenger service.

First, we might note that some of the eastern railroads with a high volume of passenger service have indeed gone bankrupt. Then we might note that Amtrak continues to lose money in the passenger business (\$441 million in 1976), despite cutting back its service to keep only the most profitable high-patronage runs. Finally, a recent news item from San Francisco also provides somewhat whimsical evidence to support the railroads' claims.

The Southern Pacific Railroad (SP) runs commuter trains up the west side of the San Francisco Bay, from Palo Alto to San Francisco, and has claimed for years that this is a money-losing proposition. (Indeed, one might wonder why BART's planners thought a commuter railroad might be more profitable on the other side of the bay.) In September 1976 the SP made a novel proposal to buy its way out of the passenger business: it offered to give away \$6 million-worth of passenger vans, to whomever would take one--provided only that the recipients would then run them as van-pools, hence attracting passengers away from the SP, so that the SP might be permitted to close down. The SP's calculations further showed that such van-pool service could offer lower prices than the railroad, as well as faster door-to-door travel.

#### WHAT WOULD SAVE ENERGY AND REDUCE URBAN PROBLEMS?

I must admit that my approval of the SP plan is somewhat biased, since it is a direct descendant of a proposal I made nine years ago to solve the passenger transportation problem in Los Angeles. My proposal had three simple steps. First, paint new, narrower lanes on all existing freeways--the new line markings to be a different color from the old, to distinguish them, and the new lanes to be only two-thirds as wide. Hence four conventional lanes become six narrow lanes, and highway capacity is increased 50 percent by a simple stroke of the brush. Then make one new traffic regulation to the effect that during the morning and evening rush hours only small cars (Hondas, say) are permitted on the freeways. The narrow lanes would be wide enough for these cars to use safely. Finally, placate the resulting large number of outraged commuters, protesting their inability to drive, by giving each and every one of them a mini-car --free of charge.

Since these small cars use about one-third the energy of a standard American car, there would be an immediate and enormous impact on the energy problem. The combination of narrow lanes and small cars would also solve the peak-hour congestion problem. (During other times, cars of any size might continue to use the freeways.) Furthermore, a mini-car can be parked in half the downtown space needed for a standard car. In addition, pollution would be reduced: mini-cars can have lower emissions, and this system would reduce the emissions resulting from stop-and-go congestion enabling all cars to travel more freely. (Electric mini-cars would be even better, of course.)

But can we afford such a solution? The answer is overwhelmingly yes. The \$10 billion that Los Angeles almost committed to a rail transit system is enough to provide a free mini-car for every commuter in the area; and, unlike the proposed transit system, the expenditure would actually do some good. This solution, even if not taken seriously, should at least provide some perspective on the enormous cost of the transit systems being planned around the United States.

Since smaller, fuel-efficient cars could play such an important role in solving many of our urban problems, we should consider other ways of promoting their use. The Carter administration's energy proposals contain some price incentives for auto users to switch from large to small cars. These incentives will have some effect, but much more effective ones could be provided. Everything we have learned from the years of transit demonstration projects points up the overwhelming importance of time savings as a determinant of transportation mode-choice: the fastest mode gets the largest share of traffic. Why not allow fuel-efficient cars to travel at the pre-OPEC speed limit of 65 mph, traffic permitting? The behavioral incentive to switch to small cars would be enormous. Even the indirect effects would be favorable--changing the image of the small car, making it the "macho," speedy vehicle, would further increase the demand for small cars. (There is nothing unprecedented about differential speed limits; we once had distinct limits for cars, trucks, and cars pulling trailers. There need be no administrative problems with such limits either: special

license plates could be given out at the time of registration, since the engine size and car type--hence the fuel efficiency--would be known at the registry.)

It is important to realize that getting people to switch car-types will be much easier than getting them to switch transportation modes: the Cadillac driver can be put into an Audi much more easily than he can be put into a bus. Furthermore, transit's current tiny share of the transportation market means that even a radical improvement in transit patronage will have relatively modest impact; while the automobile's very large share of the market means that even a small improvement in auto efficiency will have a really significant impact.

#### SOME FINAL COMMENTS

The conclusions presented here imply alternatives to current policy measures attempting to deal with transportation problems, and many of these alternative policies promise to be cheaper as well as more effective. First, on the energy question, we need not be discouraged to discover that rail transit is an energy-waster, for the corollary of this is that we are freed of the necessity of building these enormously expensive systems. Once we realize that small cars are more energy-efficient than rail transit, we are led toward policies that promote the use of such cars. Hence, rather than continuing to hope for some magical way of convincing people that private autos are bad (when their own experience tells them the opposite), we can simply concentrate on encouraging the use of small cars, through tax incentives, mandatory fuel efficiency standards, and/or differential speed limits. This not only would be easier than trying to sell transit to people who know it is an inferior alternative, but also would promote more significant energy saving: the already legislated fuel standards for 1985 will cut American gasoline consumption in half, something even the most visionary transit advocates cannot promise.

Second, we need not be discouraged to learn that ICC regulations, rather than federal highway subsidies, have led to the decline of the railroads and the incredible overcapacity and waste of our freight transportation systems. Instead, we should be encouraged that the solution to the problem is simple and cheap, and begin phasing-out these regulations.

Finally, we ought to adopt a more realistic set of expectations about the possible increases in transit patronage and the role these might play in solving our various urban problems. Yes, transit could solve these urban problems if more people would use it, but they will not; they regard transit as inferior, because it is inferior for most trips. Public transportation will always be necessary for some very densely populated cities and for some population groups in all cities, and we do have to provide it; but this will never involve a significantly greater number of trips than at present. Short of actual coercion, there is no way to attract an important share of trips onto transit because there is no way of making transit's service as good as the automobile's (as has been amply demonstrated by the failure of billions of dollars worth of transit improvement projects).

We must cease our wishful thinking and get on with the task of discovering alternative solutions to the transportation problem; in particular, we should give more attention to solutions based on "civilizing" the automobile. Promotion of small, fuel-efficient, clean cars would solve most of the same problems and would be a great deal easier to accomplish than convincing people that speed, convenience, and privacy are really not important.