

MOTOR VEHICLE TRANSPORTATION AND PROPER PRICING:  
USER FEES, ENVIRONMENTAL FEES, AND VALUE CAPTURE

Prepared for Presentation at THE OTHER ECONOMIC SUMMIT

Denver, June 20-22, 1997

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The sector of our economy that is most at odds with policies of sustainable living is transportation policy. It's not just the fact that cars are deadly—that 43,000 people are killed each year by motor vehicles and an additional two million injured, and that costs from accidents alone equal to about 8 percent of our GDP.<sup>1</sup> It's not just that dependence upon motor vehicles disenfranchises large elements of the population who—for reasons of age, financial means or disability—are unable to rely upon cars.<sup>2</sup> It's not even that communities built around highway transportation cease to be communities.<sup>3</sup> It not even solely the fact that the cost of motor vehicle transportation threaten to bankrupt us.<sup>4</sup> In the final analysis, apart from the political, economic, and social liabilities of a transportation system built largely on motor vehicle dependence, it is environmentally unsustainable. And of course that is what we must recognize.

One 1993 study concluded that "when the full range of costs of transportation are tallied, passenger ground transportation costs the American public a total of \$1.2 to \$1.6 trillion each year. This is equal to about one-quarter of the annual GNP and is greater than our total national annual expenditure on either education or health."<sup>5</sup> Japan, by way of comparison, spends an

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<sup>1</sup> In 1988, a study by the Urban Institute calculated that \$71 billion were borne in out-of-pocket costs, another \$46 billion in lost wages and household production, and \$217 billion in pain, suffering and lost quality of life. Translated into vernacular, the total of \$334 billion in lost property, worktime, and injuries and deaths. T. Miller, et al, *The Costs of Highway Crashes*, The Urban Institute, Washington, D.C., October, 1991.

<sup>2</sup> Extrapolating from the latest US Department of Transportation data, there are approximately 90 million Americans who don't have motor vehicle licenses, and many more don't own cars. Reflecting its automobile bias, however, the Department chooses to count the opposite way, the number who do have licenses and those who have one, two, and three cars. *Highway Statistics*, 1995.

<sup>3</sup> This is nowhere better expressed than in a recent book by George Kennan. For a most articulate expression of the destructive force of automobile civilization, see *Around the Cragged Hill: A Personal and Political Philosophy* (New York: Norton, 1993), pp. 159-167. It is also documented in a recent article entitled "Bowling Alone," which David Broder of the *Washington Post* considered the most important academic article of 1995. Putnam argued that our communal relationships are declining, and that an ever smaller proportion of the population is involved in social activities of a cooperative and communal nature. See Robert D. Putnam, "Bowling Alone: America's Declining Social Capital," *Journal of Democracy*, Vol. 6 (January, 1995), pp. 65-78. One study (cited in *Auto-Free Times*, Aug-Oct., 1996, p.18.) asked residents on different streets to indicate on base maps where friends and acquaintances lived. Those living on streets with the least traffic volume had three times as many friends and twice as many acquaintances as those living on the streets with heavy traffic volumes. See also *The Costs of Sprawl: Environmental and Economic Costs of Alternative Residential Development Patterns at the Urban Fringe*, Real Estate Research Corporation, April, 1974. This last study is being updated by Rutgers University under contract to US Department of Transportation and is due to be completed in spring, 1998.

<sup>4</sup> The American Automobile Association's latest figures show that the average motorist pays \$6,300 annually for the privilege of driving. American Automobile Association, *Your Driving Costs*, 1993 Edition.

<sup>5</sup> Peter Miller and John Moffet, *The Price of Mobility: Uncovering the Hidden Costs of Transportation*, New York: Natural Resources Defense Council, October, 1993. This is somewhat more than the US Department of Transportation's own calculation. The latter uses only direct measurable pecuniary costs, and estimates the figure

estimated 10.4% to satisfy all its transportation requirements, although the figure might be a bit low because not all externalities are included in the calculation.<sup>6</sup> One of the reasons we are spending so much on motor vehicle transportation is that our public policies encourage it. User fees represented only about \$33 billion in 1991 while the true costs to society were ten times that;<sup>7</sup> put another way, drivers pay only 10% of the true costs of their motor vehicle use.<sup>8</sup> Moreover, our practices on property tax and zoning land use also foster patterns of development—typically termed urban sprawl—that make us auto-dependent. The latter is beyond the scope of discussion here, but should be borne in mind.

The results of these policies are mainly two. First, as much as the policies mentioned above, patterns of land use owe their evolution to subsidies we offer to motor vehicle transportation. Second, enormous environmental externalities result from our over-dependence upon cars, especially in air pollution and in the emission of greenhouse gases. I need not talk here at any length about the consequences of SO<sub>2</sub>, CO<sub>2</sub>, and ozone, or, for other nations, about the consequence of leaded gasoline. I wish to address pricing solutions that will help us to correct imbalances and to recover appropriate costs of car and road use.

At the present time, as noted above, user fees pay about 10% of road costs. These are mainly collected in motor fuel taxes, vehicle license and registration fees, highway tolls, and parking fees. Heavy trucks pay additional fees levied largely at the state level and in different ways. Levies on gasoline and diesel fuel in this country average about 30¢ per gallon. European nations, by contrast, have motor fuel taxes as high as \$3 per gallon.<sup>9</sup> This country commonly earmarks revenues from certain sources to finance highway services only. Only four states unequivocally do not dedicate any portion of their motor fuel tax, and another twelve states have partial dedication. Twenty-seven states dedicate drivers' licenses and 38 states do so for vehicle registrations. Twenty five states dedicate all three. Hence highway users groups typically crow about all the taxes they pay to support the road system, but this is belied by all dispassionate analysis. When it comes to supporting the most commonly identified 33 direct operating

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was in the neighborhood of \$1 trillion for the year 1992, about 17 percent of GNP—converted to GDP would make it somewhat higher. Since it fails to include externalities such as pollution, accidents, and other associated costs, it seems a reasonable estimate. See *Transportation Statistics, 1994*, U.S. Department of Transportation, Bureau of Transportation Statistics, pp.4-5.

<sup>6</sup> See Walter Hook, *Counting on Cars, Counting out People*, New York: Institute for Transportation Development Policy Paper (Winter, 1994), p. 28.

<sup>7</sup> See James J. MacKenzie, et. al., *The Going Rate: What It Really Costs to Drive*, World Resources Institute, Washington, 1992.

<sup>8</sup> *Road Kill: How Solo Driving Runs Down the Economy*, Boston: The Conservation Law Foundation (May, 1994), p. 7. This study is a summary of a larger study done by Apogee Research, Inc., funded by the Joyce Foundation.

<sup>9</sup> David Malin Roodman, *Getting the Signals Right: Tax Reform to Protect the Environment and the Economy*, Worldwatch Paper 134, May, 1997, pp. 19-20.

functions of highway administration and maintenance, only 10 states agree on 13 or more, and the average is a bit over twenty. So it is misleading to refer to a state as having dedication or not when it comes to highway finance.<sup>10</sup> The remaining support comes from general funds of government or else is diffusely shifted back to society. Society subsidizes road use.

Of course there are other taxes levied on various items of motor vehicle related consumption. Sales taxes, for example, are imposed on vehicles, parts, and often on motor fuel as well. But those are general purpose taxes for support of government generally, i.e., of "public good" functions which motor vehicle use is not. Motor vehicle travel is largely a private good, and costs therefore should be recovered mostly by user fees, not taxes. It is important to understand the difference between taxes and user fees. User fees are paid according to the benefit, wear or damage which comes about from use of a service. If one doesn't use a service, one doesn't pay for it. Taxes, in contrast, are paid by everyone according to one's ability to pay; they are not voluntary. When talking about taxes, equity is measured by their progressivity or regressivity; for fees, in contrast, equity is measured in proportion to use, and progressivity and regressivity are irrelevant, just as for one's grocery bill.<sup>11</sup> Taxes should support public goods and user fees government-provided private goods; many government services involve a combination.<sup>12</sup> Some states illogically exempt motor fuel from sales taxes because a user fee is levied on it. When one understands the purposes of each, one sees that this makes no sense, and causes further social and economic<sup>4</sup> distortions.

Property taxes, which go into local government general funds, can also be construed as user fees, and do indeed pay some road costs, particularly for residential and lightly traveled areas. They do not cover all costs; in fact, because their usual design fosters sprawl, they actually create further costs.<sup>13</sup>

Of government revenues streams commonly labeled taxes, I want to identify three major kinds, each with different functions. These are 1) taxes—compulsory levies for the general purposes of government according to one's ability to pay; 2) user fees—paid by those who use services according to benefits received, direct costs imposed, or wear and damage caused; and 3) environmental fees—which recover the costs of negative externalities that otherwise are imposed on others. There is no reason why any particular item (or "base") cannot be used to collect revenues for more than one purpose. A quick illustration of each will make the case clearer.

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<sup>10</sup> H. William Batt, "Dedicated Highway and Consolidated Transportation Funds," Presented at the Annual Meeting of The Transportation Research Board, Washington, DC, January, 1992.

<sup>11</sup> Revenue designs should take into account the cost of basic necessities such as food regardless of how and by whom they are provided, and common user fees should be recognized before tax equity is evaluated. If one pays rent to a government for publicly-owned housing, for example, it is technically speaking a user fee.

<sup>12</sup> H. William Batt, "User Fees: The Nontax Revenue Alternative," *State Tax Notes*, April 5, 1993.

<sup>13</sup> Mason Gaffney, "Containment Policies for Urban Sprawl," in *Approaches to the Study of Urbanization*, Richard L. Stauber (ed.), University of Kansas Publications (Government Research Services, No. 27) Lawrence, Kansas, 1964. A properly-designed property tax, one only on land value, would have the opposite effect.

In the case of cigarettes, for example, governments usually levy a sales tax as for any other item of consumption. We also often see what is known as a "sumptuary tax" (or sin tax)—one levied on activities or items which society disapproves of. Lastly, there is beginning to be sometimes called a "Pigou<sup>14</sup> tax" to help pay the spillover costs of health care that result from smoking. But most Pigou taxes are environmental, or "green" taxes.

For motor vehicle revenues, logic dictates 1) taxes on the commodities themselves as long as we choose to rely on sales taxes to support government,<sup>15</sup> 2) fees levied on some proxy for road use such as tires and fuel to pay for such costs<sup>16</sup> to the extent that they represent private consumption—i.e., are a private good,<sup>17</sup> and 3) environmental fees to recover the costs of (or else to correct) damages to nature that are otherwise externalized. Again, it is often appropriate to attach more than one revenue to any particular base, and it is particularly appropriate to do so for petroleum.

The federal motor fuel user fee currently adds 18.4¢ per gallon.<sup>18</sup> State gasoline taxes, also user fees dedicated to highway support, currently add an additional 20¢ average per gallon. State sales taxes are a percentage of sale price, no more than 8 percent, but all but fifteen states exempt gasoline from sales tax in the mistaken belief that it is already burdened by a user fee. This creates rather than corrects distortions. Calculating a precise fee for environmental externalities is a challenge largely beyond our current abilities but we cannot wait until such time that we know. We know at least that we should have one, and we could begin it at a modest level and raise it incrementally until changes in technology and behavior patterns result in a tapering off of auto emissions. It could happen that environmental fees could totally supplant all personal and corporate income taxes as well as sales taxes, gradually phased in revenue-neutral fashion while conventional taxes are decreased. (Real property taxes are a separate discussion below.)

Highways and associated services should have user fees higher than present to recover the full costs of operations and service. Motor fuel is an excellent proxy base for highway use because it charges proportionate to use except for very heavy vehicles. Supplemented by other user fees just for those vehicles—the best design is an ESAL fee (axle-weight x distance)—would fully

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<sup>14</sup> after the name of its first advocate, British economist A.C. Pigou, whose classic *The Economics of Welfare* (1911) explored the notion of externalities.

<sup>15</sup> Several other nations have elected to impose a VAT (value-added tax) instead.

<sup>16</sup> Separate user fees should continue to pay for the costs of administration of registering motor vehicles and similarly for drivers' licenses.

<sup>17</sup> Many goods which economists consider largely private goods are nonetheless provided by governments. This is because they have the character of what is called a "natural monopoly."

<sup>18</sup> 24.4¢ on diesel fuel which is used mostly by heavy trucks. *Highway Statistics, 1992*, Table FE-21.

address the problem of rational highway pricing.<sup>19</sup> The US Department of Transportation calculated total direct expenditures for highways for 1992 as \$84 billion, of which about \$78 billion came from user revenues.<sup>20</sup> But as earlier noted, US-DOT chooses not to include as "highway related" many related costs, resulting in the distorted perspectives reflected in current policies. Local residential streets have even more the character of private goods than trunk lines, and are appropriately supported by local property taxes. Property taxes, well designed, reflect local value and the enjoyment of local (private good) services and should therefore pay for them.<sup>21</sup>

Fossil fuels are the prime candidate for the third category of revenues, Pigou fees (or taxes), because, arguably, they do the greatest environmental damage, are simple to impose, and are highly efficient in correcting the most alarming environmental problem the world faces: global warming resulting from the creation of greenhouse gases. A tax on carbon, depending on how heavy, would go far towards reducing its consumption. This is important because the best recent data project the doubling of atmospheric CO<sub>2</sub> in the next 50 to 100 years.

Briefly, in 1994, the Clinton administration entertained the possibility of an energy tax using BTUs as the base. It was explained as, and was intended to be employed as, a straight revenue source to facilitate a balanced budget. But Congress declined to consider any further taxes on energy—of any sort. Currently the gasoline tax—that 30¢/gal user fee—brings the retail price of gasoline to a total figure roughly equal to about \$10/million BTUs. Natural gas by comparison has a current retail price with taxes of \$4/million BTUs, and coal about \$2/million BTUs. Hence an additional 30¢/gal tax levied on gasoline would be equivalent to an additional charge of \$3 for each million BTUs of energy consumed.

But adding an additional \$3/million BTU energy tax to each fuel source is far less effective in discouraging greenhouse gases than using the carbon content of each of the three fossil fuels as the base. A hypothetical additional 30¢ from a gallon of oil using either BTUs or carbon as a proxy makes little difference in the total price of oil—the increase continues to be proportional. A tax of \$3/million BTUs of oil is the equivalent of \$80/ton of carbon consumed. But the final prices become significantly different when the same formula is applied to natural gas and coal.

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<sup>19</sup> ESAL means Equivalent Single Axle Load. Since pavement wear is a function of axle-weight times distance, it makes sense to employ such a formula to recover the costs of such damage, at least for heavy vehicles which cause the great preponderance of it. There are, however, many aspects of highway use where pavement wear is irrelevant (snow removal, highway police and foliage and trash control, for example) yet motor vehicle user fees also serve as an excellent proxy by which to recover such costs. See Kenneth Small, Clifford Winston, and Carol Evans, *Road Work: A New Highway Practice and Investment Policy*, Washington: Brookings, 1989.

<sup>20</sup> *Highway Statistics, 1992*, Table HF-10.

<sup>21</sup> Walter Rybeck, "The Property Tax as a Super User Charge," pp. 133-147, in C. Lowell Harriss (ed.), *The Property Tax and Local Finance*, Proceedings of the Academy of Political Science, Vol. 35, No. 1 (1983).



A tax of \$80/ton on the carbon content of either natural gas or coal works out quite differently than for the BTU tax. The figures are as follows:<sup>22</sup>

FUEL	CURRENT PRICE (including tax) \$/million BTU	FUTURE PRICE with BTU TAX (\$3/million BTU)	FUTURE PRICE with CARBON TAX (\$80/ton CARBON)
Oil (gasoline)	\$10/mm BTU	\$10+\$3+\$13	\$10+\$3=\$13
Natural Gas	\$4 /mm BTU	\$4+\$3=\$7	\$4+\$2=\$6
Coal	\$2 /mm BTU	\$2+\$3=\$5	\$2+\$4=\$6
		Total Additional Tax: \$9	Total Additional Tax: \$9

In terms of consumption of carbon, and in view of the consequences for the environment and for the phenomenon of global warming, clearly the carbon tax is far superior to the BTU tax that was proposed by the Clinton administration. The same amount of revenue is collected, but the environmental consequences are far different.

Until now, this discussion of fees has addressed only the ongoing operating costs of motor vehicle transportation, and does nothing to address the capital costs of acquiring and constructing the requisite infrastructure. Although the grand heyday of highway construction has largely passed in the U.S., the approach that follows can be employed for any remaining initiatives as well as for transit projects that may be envisioned. The best way to pay capital costs of acquisition, design and construction of transportation infrastructure is through what is called "value capture."<sup>23</sup> When a highway (or for that matter transit service) is built to serve an area, the value of the adjacent properties usually experience huge increases in value. Should their title-holders reap windfall gains from government investment? They certainly didn't earn it; it's not typically an outgrowth of their efforts or investment. The prospect even invites corruption of public decision-making. Usually they are speculators or just lucky. Those increased values can instead easily be recaptured by government in taxes to pay off bonds issued to finance that infrastructure. This works especially well for transit, and ought to be the first option explored

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<sup>22</sup> For help with this section I am indebted to my friend and colleague, Dr. David Borton, who specializes in renewable energy issues at Rensselaer Polytechnic Institute in Troy, New York.

<sup>23</sup> *Value Capture Techniques in Transportation*, U.S. Department of Transportation (DOT-T-90-11), May, 1990. In recent years, some of the best work employing this approach has been that of Robert Cervero, at University of California, Berkeley.

by those who develop (or expand) transit services— particularly light-rail urban systems.<sup>24</sup> Priced at proper levels it helps balance transportation service, rational and intensive development of land use and equity in the distribution of private benefits.

We really have to get our transportation service structure right. We will otherwise cease to be economically competitive vis-a-vis our international rivals. Typically they are spending half of what we do on transportation and are free to invest that much more in education, R&D and leisure time activities. And unless we change, we will continue to be the greatest culprit in the despoliation of the world's environment, a role which, I believe, we Americans will choose not to play if we understand.

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<sup>24</sup> In a study published when Metro, the subway serving metropolitan Washington, D.C., was one-third completed, \$2 billion was identified in new land values over and above normal growth. This amount reflected only a sample of areas around then-working Metro stations, and only those portions of neighborhoods where the evidence was beyond question. Conservative findings at all completed stations, as well as an accounting of the increments in value that were being recorded along much of the 101 mile system in advance of construction, made it evident that the growth in Metro-induced land values easily exceeded \$3.5 billion, compared with the \$2.7 billion of federal funds invested in Metro up to that time. See "Metrorail Impacts on Washington Area Land Values," Staff Study by Walter Rybeck, et al., U.S. House of Representatives Committee on Banking, Finance and Urban Affairs, Subcommittee on the City, January 2, 1981. See also "Transit-Induced Land Values: Development and Revenue Implications," by Walter Rybeck, *Economic Development Commentary*, Vol. 5, No.4 (October, 1981), pp. 24-27.

A second study, done under contract by the Wharton Business School of the Lindenwold commuter rail line outside Philadelphia further suggests the degree to which land values are affected by transportation investment. The study showed "that for every dollar of daily savings, \$443 was added to the value of [each] house... . Thus the maximum impact of the line on properties was approximately \$9,400 (the mean sales price of the sample was approximately \$62,400)... . The average daily savings is approximately \$10.34, which indicates that \$4,581 in additional value has been added to the typical house as a result of the savings generated by the line—about 7.34% of its value." See "Value Capture in Transit: The Case of the Lindenwold High Speed Line," (Wharton School, April, 1986) prepared for Urban Mass Transit Administration, NTIS, PB-86-211786, Executive Summary, p. iv.