

## **5.8 Traffic Services**

*This chapter explores the costs of public services for vehicle traffic, including law enforcement, emergency services and street lighting. These costs are mostly funded through general taxes and so can be considered an external cost of vehicle travel.*

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### **5.8.2 Definition**

*Traffic services* include policing, emergency response, planning, courts, street lighting, parking enforcement, and driver training.

### **5.8.3 Discussion**

A variety of public services are provided to support transportation activities, including law enforcement, emergency response, planning, and street lighting. With the exception of highway patrols included in state highway budgets, these services are mostly funded through local general taxes. Studies described below indicate that a significant portion of municipal government budgets are devoted to traffic services.

Although they serve a wide range of users including pedestrians and cyclists, the need for these services, and therefore their costs, tend to increase with motor vehicle traffic, since motorized travel is more dangerous and so requires more management and emergency response.

### 5.8.4 Estimates

Monetary units are in U.S. dollars unless indicated otherwise.

**Table 5.8.4-1 Traffic Services Studies Summary Table – Selected Studies**

Publication	Costs	Cost Value	2007 USD / VMT
Apogee Research (1994)	Police, fire & justice – Boston high density	Expressway \$0.024* Other \$0.010 / VMT	\$0.034 \$0.014
	Portland medium density	Expressway \$0.009	\$0.013
		Other \$0.004	\$0.006
California Energy Commission (1994)	Roadway services	\$0.012 / VMT*	\$0.017
KPMG (1993)	Police & fire	\$0.004 Canadian / Km*	\$0.007
Miller & Moffet (1993)	Traffic services - Urban	\$0.010 /VMT*	\$0.014
	Rural	\$0.002	\$0.003
	Average	\$0.005	\$0.007

More detailed descriptions of these studies are found below, along with summaries of other studies. 2007 Values have been adjusted for inflation by Consumer Price Index<sup>1</sup>. \* Indicates that the currency year is assumed to be the same as the publication year.

- Apogee Research estimates police, fire, and justice costs summarized in the table below.

**Table 5.8.4-2 Public Service Costs of Driving in Two Cities (¢ per vehicle mile)<sup>2</sup>**

	Boston		Portland	
	Expressway	Non-Expwy	Expressway	Non-Expwy
High density	2.4¢	1.0¢	1.3¢	0.5¢
Medium density	1.1¢	0.4¢	0.9¢	0.4¢
Low density	1.1¢	0.5¢	0.6¢	0.2¢

- The California Energy Commission estimates roadway service costs, including a share of law enforcement, safety, and administration at 1.2¢ per mile for all vehicles.<sup>3</sup>
- Delucchi identifies various vehicle costs borne by municipal governments, including offstreet parking (\$11.9-19.8 billion), policing (\$8.2-12.2 billion), fire protection (\$0.7-2.8 billion), and judicial and jail system expenses (\$8.7-12.4 billion).<sup>4</sup>

<sup>1</sup> Note that CPI is not the only way to adjust for inflation and results can vary significantly with different methods, see: Samuel H. Williamson (2008), "Six Ways to Compute the Relative Value of a U.S. Dollar Amount, 1790 to Present," MeasuringWorth ([www.measuringworth.com](http://www.measuringworth.com)).

<sup>2</sup> Apogee Research (1994), *The Costs of Transportation: Final Report*, Conservation Law Foundation ([www.clf.org](http://www.clf.org)), p. 138-144.

<sup>3</sup> CEC (1994), *1993-1994 California Transportation Energy Analysis Report*, California Energy Commission ([www.energy.ca.gov](http://www.energy.ca.gov)), Feb. 1994, p. 29.

<sup>4</sup> Mark Delucchi (1998), *Annualized Social Cost of Motor-Vehicle Use in the U.S., 1990-1991; Report #7*, Institute of Transportation Studies (<http://engineering.ucdavis.edu/>). Annual costs in 1991 dollars.

- Hart estimated that approximately 40% of police, 15% of fire department, 16% of paramedic services, and a major portion of public works, capital improvement, and debt service costs should be charged to automobile use in Pasadena, California, based on 1982-83 budgets.<sup>5</sup> He subtracts the cost of providing basic access for pedestrians, public service, and emergency vehicles when calculating automobile roadway costs. He concluded that automobile-related expenditures totaled \$15.7 million, 75% of which came from local general taxes instead of user fees. Automobile subsidies average about \$270 annually per household or 1.3¢ per vehicle mile. Excluding roadway facility costs (as defined in Chapter 5.6) to avoid double counting, municipal service expenditures total \$7.7 million, averaging about 0.8¢ per vehicle-mile.
- Analysis of general-jurisdiction courts of the 75 largest U.S. counties in 1996 indicated that automobile-related torts represented 49% of total court cases.<sup>6</sup>
- KPMG estimates “protective services” of traffic law enforcement and emergency services (based on 10% of police and 5% of fire department costs) at 0.4¢ Canadian per vehicle kilometer, or about 0.5¢ U.S. per vehicle mile.<sup>7</sup>
- Miller and Moffet estimate average traffic service costs at 0.5¢ per VMT, with a higher value of 1¢ in congested urban areas and 0.2¢ for rural travel.<sup>8</sup>
- Nassar and Najafi estimate law enforcement and risk management costs average about \$5,000 annually per lane mile, and two to three times higher in urban areas.<sup>9</sup> If an average lane carries 7,500 vehicles per day, this averages 0.2¢ to 0.5¢ per VMT.
- Expenditures on “City and County Services” (excluding roadway facility costs) average \$98 per capita in the Puget Sound region, or about 0.8¢ per vehicle-mile.<sup>10</sup>
- Ridgeway calculated that 40% of police activities, 15% of fire department, and a major component of public works, capital facility expenditures, and municipal debt should be allocated to automobile use, for an average external cost exceeding 0.3¢ per VMT.<sup>11</sup> He mentioned but excludes other costs, including locally funded medical care, parking facility costs, pollution control, and planning.

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<sup>5</sup> Stanley Hart (1985), “An Assessment of the Municipal Costs of Automobile Use,” self-published graduate studies report (Pasadena).

<sup>6</sup> CBO (2003), *The Economics of U.S. Tort Liability: A Primer*, Congressional Budget Office, ([www.cbo.gov](http://www.cbo.gov)); at [www.cbo.gov/showdoc.cfm?index=4641&sequence=3](http://www.cbo.gov/showdoc.cfm?index=4641&sequence=3).

<sup>7</sup> KPMG (1993), *Cost of Transporting People in the British Columbia Lower Mainland*, Greater Vancouver Regional District ([www.metrovancouver.org](http://www.metrovancouver.org)), p. 29.

<sup>8</sup> Miller and Moffet (1993), *The Price of Mobility*, National Resource Defense Council ([www.nrdc.org](http://www.nrdc.org)).

<sup>9</sup> Fadi Emil Nassar and Fazil Najafi (1989), “Quick Approach to Estimate Law Enforcement Cost on Urban Roads,” *Transportation Research Record 1262*, TRB ([www.trb.org](http://www.trb.org)), p. 39-47.

<sup>10</sup> PSRC (1996), *The Costs of Transportation; Expenditures on Surface Transportation in the Central Puget Sound Region for 1995*, Puget Sound Regional Council ([www.psrc.org](http://www.psrc.org)), page 17.

<sup>11</sup> Daniel Ridgeway (1990), “An Assessment of the Cost of Private Motor-Vehicle Use to the City and County of Denver,” self-published graduate studies paper, Denver.

- Small cites an estimate that urban traffic service costs (besides roadway facility costs) average 2.8¢ per vehicle mile in 1992 dollars (4.1¢ per mile in 2007 dollars).<sup>12</sup>
- Local governments in the Chicago region spend an average of \$130 per registered motor vehicle in general taxes devoted to road infrastructure and services.<sup>13</sup>
- Transport Canada (2004) assumes that policing expenditures related to road traffic regulation in Canada are within the range of 10% to 60% of total policing expenditures, with the low value derived from RCMP (national police) estimates.<sup>14</sup> This study identifies the need for further investigation to narrow this range as part of the Transport Canada Full Cost Investigation project.

**Table 5.8.4-3 Policing Expenditures Related to Road Traffic in 2000** (2000 Can. \$)

	Low	High
Municipal	\$391 million / year	\$2344 million / year
Provincial	\$157	\$944
Federal	\$132	\$792
Total	\$680	\$4080

*Source: Table 11*

### 5.8.5 Variability

Miller and Moffet indicate that service costs are higher in congested urban areas than for rural driving. This is supported by Nassar and Najafi’s estimates.

### 5.8.6 Equity and Efficiency Issues

Since traffic services are mostly funded through general taxes, they can be considered an external cost, and so are inequitable and inefficient.

### 5.8.7 Conclusions

Several estimates indicate that traffic services not funded by vehicle user fees average more than 1¢ per mile, with higher costs in urban areas. Urban Peak travel is estimated to impose service costs of 2¢ per mile, Urban Off-Peak 1.3¢ per mile, and Rural travel 0.7¢. This is applied equally to all motor vehicles. Rideshare passengers are estimated to

<sup>12</sup> Ken Small (1992), *Urban Transportation Economics*, Harwood ([www.taylorandfrancisgroup.com](http://www.taylorandfrancisgroup.com)), p. 82.

<sup>13</sup> David Urbanczyk and Jeanette Corlett (1995), *The Cost of Driving in the Chicago Metropolitan Region*, Metropolitan Planning Council ([www.metroplanning.org](http://www.metroplanning.org)), Working Paper No. 2, 1995.

<sup>14</sup> Transport Canada (2004), *Interim Estimates of the Financial Costs and Revenues Associated with the Provision of Road Infrastructure in Canada, 2000*. ([www.tc.gc.ca](http://www.tc.gc.ca)); at [www.tc.gc.ca/pol/en/Report/FullCostInvestigation/Road/tp14490/tp14490.pdf](http://www.tc.gc.ca/pol/en/Report/FullCostInvestigation/Road/tp14490/tp14490.pdf).

impose no additional cost. Bicycling, walking, and telework are estimated to cost 10% as much per mile as an automobile.

**Table 5.8.7-1 Estimate Traffic Service Costs (2007 U.S. Dollars per Vehicle Mile)**

Vehicle Class	Urban Peak	Urban Off-Peak	Rural	Average
Average Car	0.020	0.013	0.007	0.012
Compact Car	0.020	0.013	0.007	0.012
Electric Vehicles	0.020	0.013	0.007	0.012
Van/Light Truck	0.020	0.013	0.007	0.012
Rideshare Passenger	0.000	0.000	0.000	0.000
Diesel Bus	0.020	0.013	0.007	0.012
Electric Bus/Trolley	0.020	0.013	0.007	0.012
Motorcycle	0.020	0.013	0.007	0.012
Bicycle	0.002	0.001	0.00	0.001
Walk	0.002	0.001	0.00	0.001
Telework	0.002	0.001	0.00	0.001

**Automobile Cost Range**

Cost ranges are based on various cost estimates in literature described in this chapter.

<u>Minimum</u>	<u>Maximum</u>
\$0.004	\$0.020

### 5.8.8 Information Resources

*Information sources on traffic service costs are described below.*

*International Budget Project* ([www.internationalbudget.org](http://www.internationalbudget.org)) provides information and resources for evaluating government expenditures, including municipal budgets.

*International City/County Management Association* ([www.icma.org](http://www.icma.org)) provides information and resources on local government management, performance review, and budgeting. Online library for members available (membership is free).

*National Advisory Council on State and Local Budgeting* ([www.gfoa.org](http://www.gfoa.org)) provides information on municipal budgeting.

ICLEI (1997), *Uncovering Auto Subsidies: Calculating How Much Your Local Government Spends Subsidizing Cars*, Cities for Climate Protection, International Council for Local Environmental Initiatives ([www.iclei.org/co2/auto/cars.htm](http://www.iclei.org/co2/auto/cars.htm)).

*International Local Government Home Page* ([www.oultwood.com](http://www.oultwood.com)) includes links to local governments from around the world, links to organizations that monitor and study municipal governance issues, and information about local government.

*Municipal World* ([www.municipalworld.com](http://www.municipalworld.com)) is a monthly magazine on municipal government, published since 1891. Searchable archives include many articles on municipal budgeting.

Transport Canada (2003-2007), *The Full Cost Investigation on Transportation in Canada*. ([www.tc.gc.ca](http://www.tc.gc.ca)) includes studies of traffic service costs; at [www.tc.gc.ca/pol/en/aca/fci/menu.htm](http://www.tc.gc.ca/pol/en/aca/fci/menu.htm).