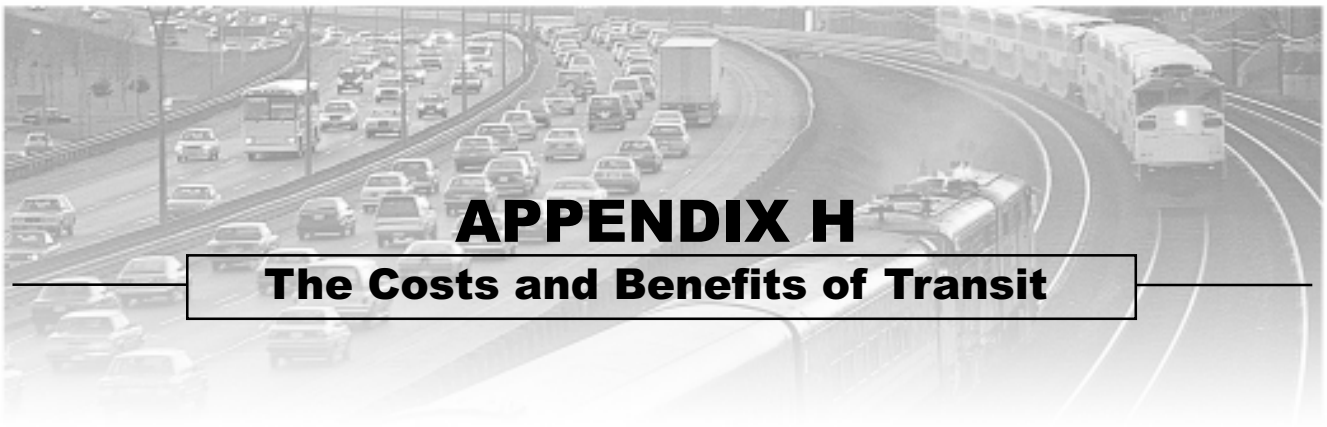


APPENDIX H
The Costs and Benefits of Transit

The three public policy functions served by mass transit in the United States are described in Chapter 2. These functions are: *basic mobility*, providing mobility services to the poor and elderly; *congestion relief*, helping to alleviate automobile congestion on crowded urban expressways and arterials; and *location efficiency*, enabling urban residents to live in high density, mixed use developments without dependency upon auto transportation.

Operating Costs by Policy Function

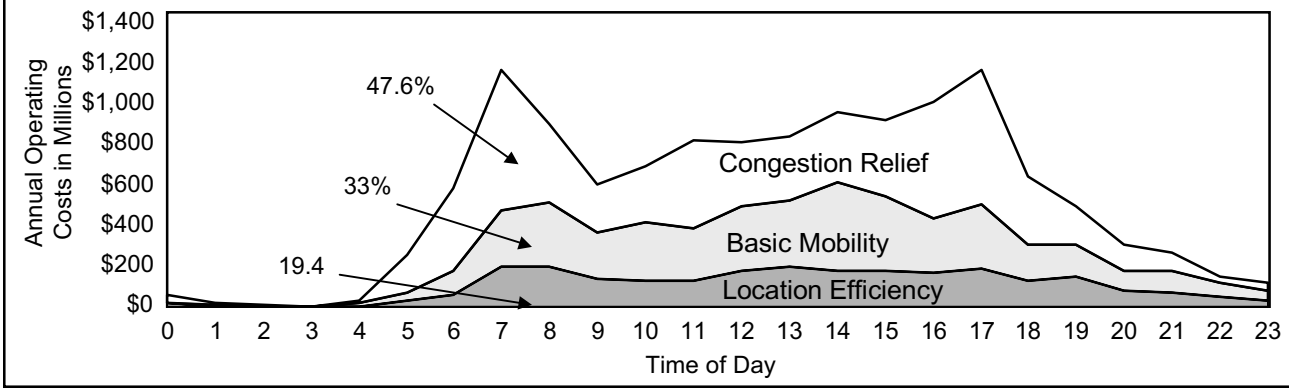
The cost of a particular transit trip depends on a number of variables. The most important factors include:

1) Time of day (peak or off-peak)
2) Vehicle type (bus or rail)
3) Trip distance.

Exhibits 2-16 and 2-17 show how the trips under each of the three policy functions vary across each of these factors. This variation can be combined with estimates of the contribution of each of the three cost factors to allocate transit operating costs by policy function. Exhibit H-1 illustrates the relative contribution of each of the three market niches to transit costs by time of day in 1995. Transit services for the 34.7 percent of trips filling congestion relief roles (those made by above-poverty households with cars) account for 47.6 percent of costs. The basic mobility trips (40.1 percent) incur 33.0 percent of operating costs, while the like figure for the 25.3 percent of trips made for location efficiency is 19.4 percent. This cost pattern reflects the emphasis that most transit systems place on providing a means for commuters to circumvent congested highways.

Exhibit H-1

Transit Function Costs by Time of Day, 1995*

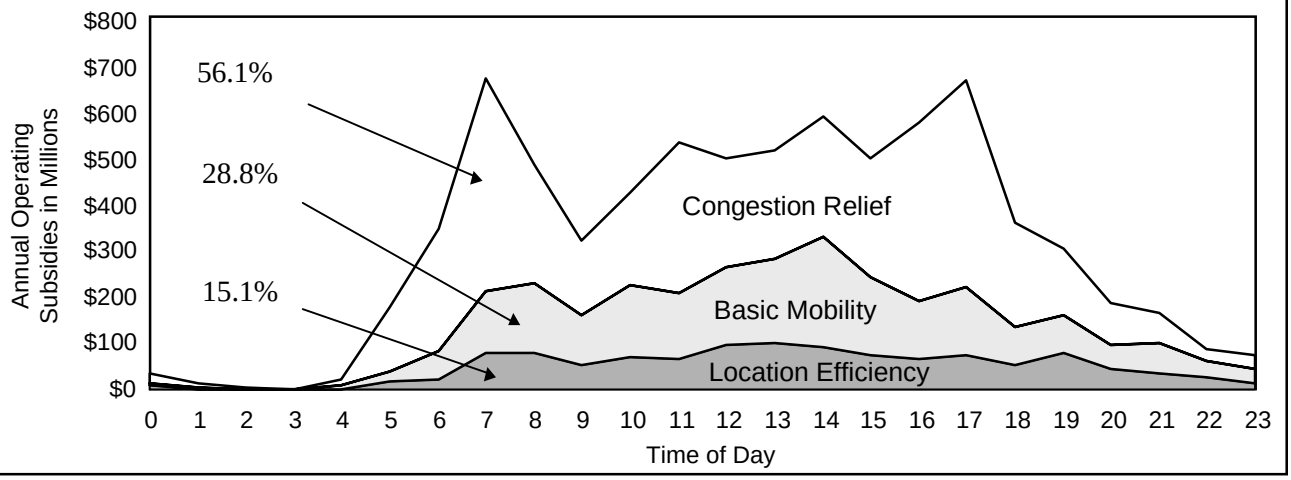


*Approximately 21 percent of costs are not classified in this chart.

Exhibit H-2 shows the costs by transit policy function remaining after the subtraction of fare revenues. This procedure provides an estimate of the subsidies that local, State, and Federal taxpayers provided to local transit operations in 1995. The greatest subsidies are incurred for congestion relief, where 56.1 percent of public subsidies were incurred in 1995. The 40.1 percent of basic mobility trips accounted for only 28.8 percent of public subsidies. Similarly, 25.3 percent of location efficiency trips incurred 15.1 percent of public subsidies.

Exhibit H-2

Transit Subsidies by Function and Time of Day, 1995*



*Approximately 21 percent of costs are not classified in this chart.

Benefits by Policy Function

The benefits of transit can also be classified by policy function. Exhibit H-3 arrays transit's benefits across the three market niches. These benefits and the methodology used to derive them can be summarized as follows:

- The benefits of basic mobility are estimated at $23 billion in 1995. These benefits are calculated using econometric consumer surplus analysis, and represent the difference between transit riders' willingness to pay for trips and the amount they actually do pay. This amount is unlikely to change significantly from year to year.

- Location efficiency was estimated to be worth $20 billion in 1995. This calculation is based on hedonic measurements of property values relative to proximity to transit services, presumed to reflect inter alia auto ownership cost savings.

Exhibit H-3

Transit's Estimated Benefits by Market Niche, 1995

	Aggregate Benefits	Measurement Used*
Basic Mobility	$23 billion	Consumer Surplus
Location Efficiency	$20 billion	Property Values
Congestion Relief	$15 billion	Travel Time

* 1993 Estimates *(FTA 1996 Report: An Update)*
Source: FTA analysis of 1995 NPTS Database.

- The benefits of congestion relief provided by transit are estimated at $15 billion in 1995. This estimate is based on the travel time savings from using transit and the cross price elasticities between auto travel on congested freeways and nearby rapid transit lines.

These measurements are imprecise, representing an aggregation of benefits across a variety of circumstances. However, the scale and relative benefit amounts among transit's market niches are consistent with economic theory and with the willingness of local taxpayers to persistently support transit in serving these niches as worthwhile public policy functions.

Exhibit H-4 summarizes the per-trip costs, subsidies, and benefits of transit, according to the public policy functions described earlier. With a per-trip benefit of $11.66, location efficiency transit services appear to generate the greatest return for the lowest subsidy ($0.85). The total net benefit of location efficiency in 1995 was $9.82 per passenger. Congestion relief generated the least net benefit, $3.07. Basic mobility produced a per-trip benefit in the intermediate range of $6.44.

Exhibit H-4

Per-Trip Summary of Transit's Economic Performance, 1995

	Cost	Subsidy	Benefit	Net Benefit
Basic Mobility	$ 1.96	$ 1.01	$ 8.40	$ 6.44
Location Efficiency	$ 1.85	$ 0.85	$11.66	$ 9.82
Congestion Relief	$ 3.29	$ 2.29	$ 6.37	$ 3.07

Source: FTA analysis of 1995 NPTS Database.