



***FINANCING  
THE  
MBTA***

**An Efficient  
and  
Fare Solution**

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## EXECUTIVE SUMMARY

The Massachusetts Bay Transportation Authority (MBTA) is a government agency in need of far-reaching reform. A few facts:

1. The MBTA could save \$58.87 million in FY 2000 operating costs by increasing efficiency to levels achieved by comparable transit authorities and without sacrificing service.
2. The MBTA is subject to no budgetary discipline: Under a practice known as “backward funding,” the MBTA receives what amounts to a blank check from the state to incur expenses with assurance of reimbursement up to 18 months later. It routinely transfers funds from line items with surplus funds to those in deficit and routinely receives supplemental appropriations.
3. Massachusetts taxpayers pay on average \$203 per year each to subsidize the MBTA, whether they use the system or not. The total state subsidy is \$608 million. That comes to about 8% of the average taxpayer’s income tax bill.
4. In 1997, the MBTA paid 3,600 of its 6,000 workers on average 65% more than other Massachusetts employers for workers in certain comparable occupations.
5. The MBTA pays, on average, as much as 52% more than other transit authorities pay the same workers. It pays a “Delivery Person” \$21.85/hr, compared to \$14.38/hr by the Maryland Transit Authority (Baltimore) and \$15.69/hr by the New Jersey Transit Corporation. It pays a “General Helper” \$19.83/hr, compared to \$16.23/hr by the New York Transit Authority under its contract with the Transit Workers Union, Local 1056.
6. The MBTA devotes a comparatively large share of its budget to administrative costs (20%) and to fringe benefits (31%).
7. The MBTA charges one of the lowest fares in the nation. Subway fares are, on average, 38% below those charged by comparable authorities, and bus fares are 55% lower.

8. The state effectively subsidizes 100% of MBTA debt service, which, since 1980, has increased from 11% to 35% of the MBTA's total budget. Since the mid-1980s, the MBTA's reliance on state funds has risen from 40% to 65% of its capital expenditures.
9. Adjusted for inflation, the MBTA's deficit increased 1060% from 1964 to 1999 or at an annual rate of 7.25%.
10. In 1997, the MBTA made 3.8 times as many bus trips as all of the state's regional transit authorities combined. Yet, the state subsidy was 6.19 times higher for MBTA bus operations than for RTA bus operations. The MBTA subsidy per trip was \$1.54; the RTA subsidy was \$.94.
11. MBTA reform would free up public funds for other projects. The MBTA could, by increasing efficiency and making reasonable fare increases, save the state \$217.24 million in subsidies, permitting it to fund an additional \$2.66 billion in capital projects.

House bill H-4400, under consideration by the Massachusetts legislature, is intended to address some of these problems. The bill does not, however, put the MBTA on a budget. Rather, it permits state funds going to the MBTA to reach \$800 million per year by 2004, a level that would far exceed what is needed to maintain existing levels of service.

We propose an alternative solution under which the state would reduce the FY 2000 subsidy by \$217.24 million, from a projected \$623.50 million to \$406.26 million. By freeing up \$217.24 million in revenues now going to the MBTA, the state could fund \$2.66 billion in new infrastructure spending.

Under this plan, the share of MBTA operating expenses subsidized out of state funds would be brought in line with that for a "peer group" of eight comparable transit authorities. The share of MBTA debt service paid by state funds would be reduced by 25%.

The MBTA would maintain existing service levels by raising fares and by increasing cost efficiency to a level comparable to that of the peer group of eight and of the RTAs. Fares would rise by 124%, bus fares rising from \$.60 to \$1.35 and subway fares from \$.85 to \$1.90.

These changes would bring MBTA operating costs and subsidies into line with those exhibited by comparable transit authorities. They would also shift part of the responsibility for debt service to MBTA riders, reflecting the decline in federal funding of MBTA capital expenditures that has taken place since the mid-1980s.

## INTRODUCTION

The Massachusetts Bay Transportation Authority (MBTA) is a government agency in need of reform. The MBTA has become a model of inefficiency and dependency on government largess.

Recent proposals are aimed at remedying this situation by tying the MBTA's budget to a fraction of the sales tax. The essence of this solution is to substitute one budget-busting practice for another. It would end "backward funding," whereby the state reimburses the MBTA, after the fact, for expenses incurred up to 18 months earlier. But it would also provide the MBTA with a subsidy that would grow with the state economy without regard to ridership, inflation or any factor related to actual funding requirements.

The problems go so deep that they cannot be solved without putting the MBTA on a fixed budget. Under this budget, the MBTA would receive only the subsidy that it needs in order to maintain existing levels of service, given reasonable expectations about inflation and the growth of ridership.

Put on this budget, the MBTA would increase operating efficiency, pay a reasonable share of its debt service and roughly double fares. Though more far-reaching than any proposal currently before the legislature, the one offered here merely requires the MBTA to achieve levels of efficiency and self-sufficiency that are already achieved by comparable transit authorities in Massachusetts and other states.

# PROBLEMS AND SOLUTIONS

## Problems

The problems fall into four categories:

1. the existence of a state infrastructure crisis, to which the MBTA has become a leading contributor;
2. budget practices under which Massachusetts absorbs all capital expenditures and offers the MBTA a blank check to cover its operating expenses;
3. high labor costs and overhead that reduce MBTA efficiency; and
4. an unwillingness to bring fares into line with those charged by comparable authorities in other states.

There is a recognized need to address these problems. The Massachusetts House of Representatives is debating H-4400, which would dedicate one-fifth of state sales tax revenue to MBTA operations and debt service.<sup>1</sup> H-4400 would end backward funding.

We suggest a more far-reaching solution. We would end backward funding but, in addition, require the MBTA to operate on a substantially lower subsidy. Under our proposal, the state would determine, in advance and based on norms met by other transit authorities, the amount of money it would provide the MBTA in the forthcoming fiscal year. The MBTA would then be required to meet any remaining financial obligation during that year, as needed, by cutting costs or raising fares. The state subsidy to the MBTA would increase only with ridership and inflation.

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<sup>1</sup>See Commonwealth of Massachusetts, House of Representatives, Committee on Ways and Means, *FY 2000 Budget Recommendations*, H-4400, April 1999.

## The Massachusetts Infrastructure Crisis

Massachusetts is in the throes of an infrastructure crisis. Educational and port facilities require modernization, public housing and state office buildings need rehabilitation and state information systems need upgrading.<sup>2</sup> Roads, bridges, courthouses and libraries are in disrepair. A 1998 study ranked Massachusetts 48th in the nation for quality of roads and bridges.<sup>3</sup>

In recent years the greatest pressure for capital spending has come from the Central Artery/Tunnel (CA/T) project, whose current and future financing needs of \$10.8 billion are crowding out other state capital projects.<sup>4</sup> In 1998, the CA/T received \$1.4 billion in funding, while other state transportation projects received \$563 million, 27% less than in 1997.<sup>5</sup>

Pressure on the state capital budget intensified in 1997 when the federal government drastically reduced its financial support for the CA/T from \$830 million/year to \$550 million/year for the next six years. As a result, the CA/T will absorb a growing share of the Commonwealth's capital resources.

Transportation already accounts for almost 80% of state capital spending. Fifty-one percent of general obligation bonds will be issued to finance transportation projects.<sup>6</sup> See Table 1.

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<sup>2</sup>Massachusetts Taxpayers Foundation. *Reaching the Breaking Point: The Commonwealth's Capital Dilemma*. Boston: Massachusetts Taxpayers Foundation, January 1999, 2.

<sup>3</sup>D. T. Hartgen and E. L. Presutti, *Resource Versus Results: Comparative Performance of State Highway Systems: 1984-1996, Seventh Annual Report*. City: University of North Carolina, April 30, 1998.

<sup>4</sup>Massachusetts Turnpike Authority. *Central Artery/Tunnel Project, Finance Plan*, October 1998.

<sup>5</sup>*Ibid.* 35.

<sup>6</sup>Commonwealth of Massachusetts. *Information Statement*, May 5, 1998. A-35.

Table 1 - General Obligation Bond Financed State Capital Expenditures

(\$ millions)

<b>Fiscal Year</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>
Economic Development	66	51	36	36	36
Infrastructure	237	214	202	202	202
Information Technology	56	48	29	29	29
Community Development	67	67	71	71	71
Environment	93	119	105	105	105
SRF/Title 5	8	4	35	35	35
Public safety	15	9	9	9	9
Transportation	458	488	513	513	513
Grand total	1,000	1,000	1,000	1,000	1,000
Transportation % of Total	46%	49%	51%	51%	51%

Source: Massachusetts House Committee on Long-Term Debt and Capital Expenditures, March, 1998.

Another element in this crisis is the state's bond cap. Massachusetts operates under a self-imposed limit on the issuance of general obligation bonds for capital spending. Originally set at \$825 million in 1992, but since raised to \$1 billion, the bond cap is credited with helping the state recover from fiscal problems that bedeviled it ten years ago. Despite the state's economic recovery, as manifested in recurrent state surpluses, there is reason to keep the bond cap in place. This is because Massachusetts still has a comparatively high level of indebtedness. In 1996, Massachusetts was third highest in the nation in terms of its debt service per capita.<sup>7</sup>

The state supplements its \$1 billion in general obligation bond sales with grant anticipation notes totaling \$1.5 billion. This level of borrowing has not, however, proved adequate. Thus, in 1997 the legislature shifted part of the additional financing needs from general taxpayers to "third parties."

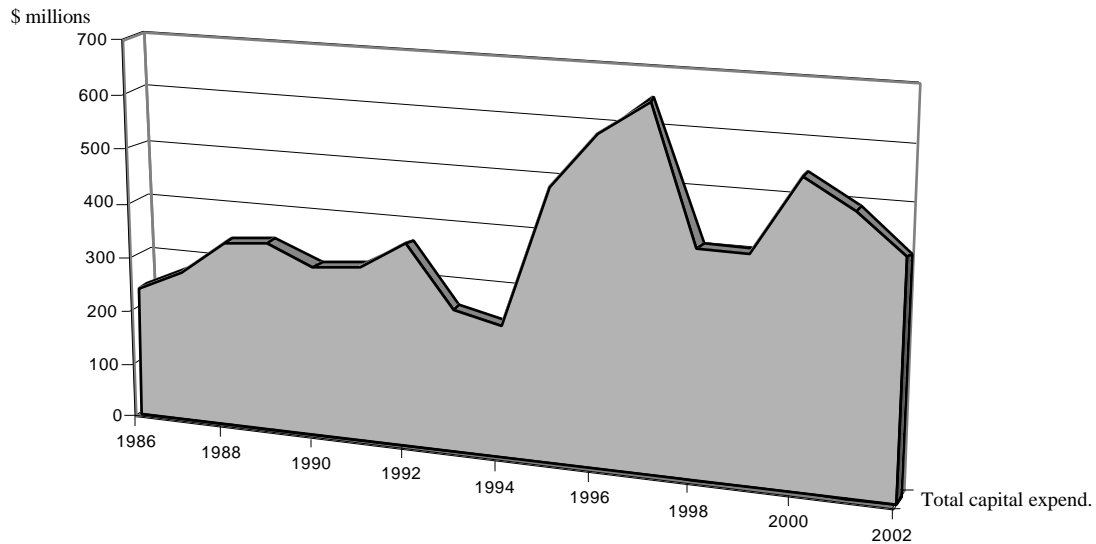
As designated by the state legislature, these third parties were the Massachusetts Turnpike Authority and the Massachusetts Port Authority, which were compelled to contribute \$1.1 billion and \$200 million, respectively, to the CA/T. Because bonds issued by these authorities are amortized by tolls collected on the Massachusetts Turnpike and by airport taxes levied on airline passengers, this required the Turnpike and Port authorities to impose additional burdens on users of their roads and facilities.

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<sup>7</sup>Massachusetts Taxpayers Foundation, *Reaching the Breaking Point*, Table 2.

The MBTA has itself become a major part of the infrastructure problem. The MBTA's capital budget will run about \$500 million a year for the period 1995-2002. This represents a doubling of capital spending since 1986. See Figure 1.

Figure 1 - MBTA Capital Expenditure, 1986-2002



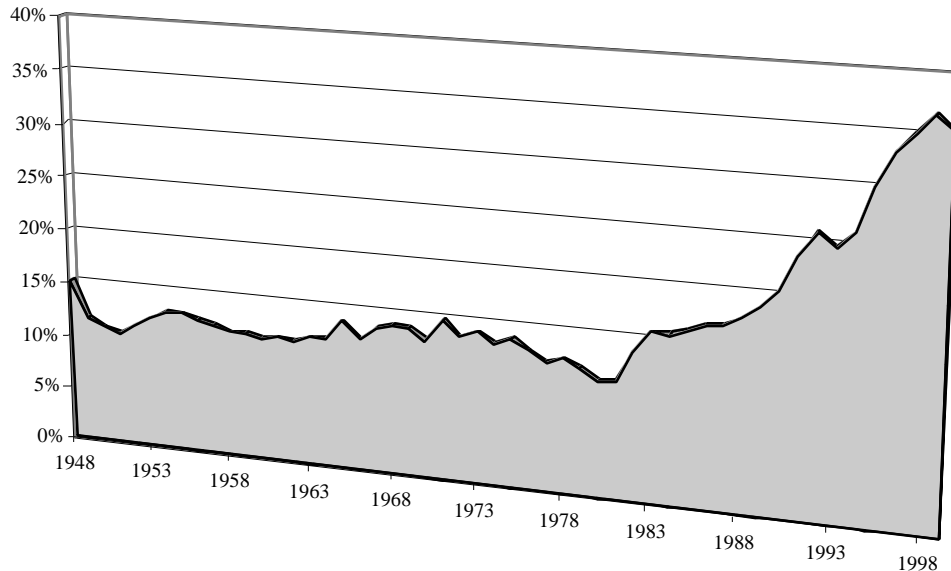
Source: MBTA Capital Accounting Department, April 1999.

The problem is compounded by the fact that the share of MBTA capital spending paid for by federal funds has deeply declined. In 1986, the federal government paid for 60% of MBTA capital spending, with the remaining 40% coming from the state. For the period 1995-1998 the federal share fell to 40% and is expected to fall to 35% for 1998-2002.

As a result of increased capital spending, the MBTA's budget experienced substantial growth in debt service, reflecting fleet replacement, infrastructure rehabilitation and service expansion over the last decade. Debt service tripled as a

fraction of its total operating budget from 1980 to 1999, growing from 11% to 35%. See Figure 2.

Figure 2 - MBTA Debt Service as % of Total Budget, 1948-1999



Source: MBTA financial statements.

By law, state taxpayers pay 90% of the debt service on state bonds floated to fund MBTA capital expenditures.<sup>8</sup> In reality, however, the state pays the remaining 10% as well. This is because other MBTA funds cover only about 33% of operating expenditures exclusive of debt service.

In 1998, debt service was \$312.9 million.<sup>9</sup> Financial projections indicate that in 2002 debt service will be 44% above what it was in 1997. This will amount to an increase of \$122.6 million over the five-year period, 1997-2002.<sup>10</sup>

<sup>8</sup>Massachusetts General Laws, Chapter 161/A.

<sup>9</sup>MBTA Advisory Board Finance Committee. *Preliminary Report to the MBTA Advisory Board, MBTA Fiscal Year 1999 Budget Requested*, April 15, 1998, Appendix-A-1.

<sup>10</sup>Ibid. 8.

MBTA bonds issued to finance capital spending lie outside the \$1 billion per year cap. Financial markets, however, see MBTA bonds as interchangeable with bonds issued for other purposes, such as financing libraries. Thus, a dollar of state funds used to finance MBTA projects is a dollar that is not available to finance other projects. If Massachusetts were to free up funds now being absorbed by MBTA debt, these funds would be available to pay debt service on bonds issued to finance other new infrastructure spending.

## Budget Practices

The FY 1999 MBTA budget (including debt service as well as operating expenditure) calls for \$936 million in expenditures, of which \$608 million or 65% will be defrayed through state subsidies.<sup>11</sup> That's about \$203 per state taxpayer or 8% of the average taxpayer's state income tax liability.<sup>12</sup>

Backward funding has produced a state of affairs in which the MBTA operates, in effect, without a budget. As the MBTA Advisory Board Finance Committee has noted in several reports and budget analyses, the authority routinely balances its books by covering overspending on particular line items with surplus funds from others.<sup>13</sup> This practice masks the actual growth of various problem areas (particularly labor costs in 1994 and labor cost and debt service cost in 1997). Over the period 1994-1999, the MBTA has requested and received approval to transfer funds on ten occasions. It has received four supplemental appropriations since 1997.<sup>14</sup> See Table 2.

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<sup>11</sup>The MBTA received a supplemental appropriation of \$23.8 million to its FY 99 budget to fund the increased cost of union wages and benefits in February 1999. Thus, its total budget currently stands at \$936 million.

<sup>12</sup>We obtain this estimate by computing \$608 million/3 million taxpayers to get \$203. The number of taxpayers and residents in communities served by the MBTA is about the same, 3 million. Estimated personal income tax collection in 1999 is \$7.6 billion. Thus, average tax paid per taxpayer: \$7,600million/3million= \$2533. Then \$203/\$2533=0.08.

<sup>13</sup>See various MBTA supplemental appropriations and transfer requests submitted to the MBTA Advisory Board Finance Committee 1994 through 1999.

<sup>14</sup>MBTA Advisory Board Finance Committee, *MBTA Budget Requests versus Advisory Board Recommendations: FY94 through FY99*.

In order to understand the importance of these budgetary adjustments, it is useful to measure them as a fraction of “net cost of service in excess of income,” defined as total costs (operating plus debt service costs) in excess of fare revenues and other agency-generated revenues.

Table 2 - MBTA Budget and Supplemental Appropriations, 1994-1999

(\$ millions)

<b>Fiscal Year</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>
Net cost of service	417.58	366.09	332.24	341.79	376.54	442.68
Supplemental appropriations						
First supp. app.				7.50	16.22	23.83
Second supp. app.				21.58		
Total				29.08	16.22	23.83
% of net cost of service				8.51%	4.31%	5.38%
Transfers						
First transfer	36.96	13.41	39.15	3.20	9.54	
Second transfer	7.81		15.79	14.34	0.61	
Third transfer				6.76		
Total	44.77	13.41	54.94	24.30	10.15	
% of net cost of service	10.72%	3.66%	16.54%	7.11%	2.70%	

Source: MBTA Advisory Board Finance Committee, April 1999

In 1997, the MBTA received two supplemental appropriations (the first for \$7.50 million and the rest as shown in Table 2). Supplemental appropriations for 1997 totaled \$29.08 million or 8.51% of net cost of service. Transfers for the same year came to 7.11% of net cost of service. Supplemental appropriations and transfers of this significance are symptomatic of a government agency that is unable to balance its budget or, indeed, hold to any budget.

### High Labor Costs and Other Inefficiencies

Using standard measures for comparing service efficiency and cost effectiveness, we compared the MBTA to eight comparable transit authorities and to nine of the 15 regional transit authorities in Massachusetts.<sup>15</sup> We found that these authorities generally

<sup>15</sup>In selecting peer agencies, besides focusing on the size of the transit authority we also considered the size of the metropolitan area served, variety of transportation services offered, age of the system, and influence of unions in setting corporate policy. The eight comparable authorities are New York

outperformed the MBTA over the last 20 years. If the MBTA currently operated at least as efficiently as these other authorities, it could reduce operating costs by 10% or by \$58.87 million in 2000. See Appendix.

We examined 1997 data on hourly wages for transit authority workers and compared these wages to the wages paid to similar workers in the same states.<sup>16</sup> The data relate to six contracts entered into by the MBTA, the New York City Transit Authority (NYCTA), the New Jersey Transit Corporation and the Maryland Transit Authority.

We found that transit authority employees generally received substantially higher wages than their counterparts in the same occupations employed elsewhere in the state. Public transit authorities generally paid a premium over other employers for workers in the same occupation. The difference is that the premium paid by the MBTA was higher than that for the other transit authorities.<sup>17</sup> Specifically:

1. The NYCTA paid 38.25% more than other New York State employers for workers covered by two of its contracts and 26.179% more for workers covered by a third contract.<sup>18</sup>
2. The New Jersey Transit Corporation and the Maryland Transit Authority paid premiums of 25.6% and 47.0%, respectively.<sup>19</sup>
3. The MBTA's current contract with the American Transit Union, Local 589 covers about 3,600 employees or 60% of the MBTA workforce. For almost all the

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City Transit Authority, New Jersey Transit Corporation, Chicago Transit Authority, Southern Pennsylvania Transportation Authority (Philadelphia), City of Detroit Department of Transportation, Washington Metropolitan Area Transit Authority, Maryland Mass Transit Administration (Baltimore) and Port Authority of Allegheny County (Pittsburgh). The nine regional transit authorities (RTAs) are Pittsfield-Berkshire RTA, Brockton Area Transit Authority, Greater Attleboro-Taunton RTA, Lowell RTA, Merrimack Valley RTA, Montachussets RTA, Pioneer Valley TA, Southeastern Regional TA, Worcester RTA.

<sup>16</sup>Department of Labor, Bureau of Labor Statistics, *Occupational Employment Statistics, Massachusetts 1997*, [http://stats.bls.gov/oes/state/oes\\_ma.htm#b80000](http://stats.bls.gov/oes/state/oes_ma.htm#b80000).

<sup>17</sup>In October 1998 the MBTA signed its latest union contract with the Amalgamated Transit Union (ATU) Local 589, increasing wages by 18% over the next five years.

<sup>18</sup>The NYCTA contracts are with the ATU Local 1056, ATU Local 726 and the Transit Workers Union (TWU) Local 100.

<sup>19</sup>The New Jersey contract is with the ATU; the Baltimore contract is with ATU Local 1300.

occupations covered by this contract, the MBTA pays, on average, about 65% more than other Massachusetts employers pay workers in the same occupations.

The MBTA not only pays a higher premium than other transit authorities for certain workers, it pays more than other transit authorities for similar kinds of labor. We examined 1999 data for workers in eight occupations employed by the MBTA, the NYCTA (three contracts), Baltimore and New Jersey. In every instance (except where certain data were not available), MBTA wages exceed those paid by the other transit authorities.<sup>20</sup> See Table 3.

Table 3 - Hourly Wages for Eight Transit Authority Occupations, 1999

	General Helper		Laborer		Car Cleaner		Repairman	
	Wage	%	Wage	%	Wage	%	Wage	%
MBTA	\$19.83	--	\$16.20	--	\$19.83	--	\$22.46	--
Baltimore	17.33	14.43	13.69	18.33	13.02	52.30	16.91	32.82
New Jersey	15.34	29.27	14.52	11.57	n.a.	n.a.	18.41	22.00
New York, ATU #100	15.56	27.44	15.56	4.11	13.13	51.03	20.70	8.50
New York, ATU #726	16.23	22.18	15.55	4.18	13.13	51.03	20.70	8.50
New York, TWU #1056	16.23	22.18	15.55	4.18	13.13	51.03	20.70	8.50

	Bus Driver		Storeroom Attendant		Delivery Person		Token Collector	
	Wage	%	Wage	%	Wage	%	Wage	%
MBTA	\$19.46	--	\$22.45	--	\$21.85	--	\$18.97	--
Baltimore	16.91	15.08	17.49	28.36	14.38	51.95	16.06	18.12
New Jersey	n.a.	n.a.	16.08	39.61	15.69	39.26	n.a.	n.a.
New York, ATU #100	17.29	12.55	20.71	8.40	n.a.	n.a.	18.95	0.11
New York, ATU #726	17.29	12.55	20.71	8.40	n.a.	n.a.	n.a.	n.a.
New York, TWU #1056	17.29	12.55	20.71	8.40	n.a.	n.a.	n.a.	n.a.

Source: Union contracts

Table 3 shows the average hourly wage applicable to each occupation, and, for each of the other transit authorities (or its union local), the percentage excess of the MBTA wage over the wage paid by that authority. For example, the MBTA currently pays “General Helpers” on the average \$19.83/hr, compared to the New Jersey Transit Authority, which pays \$15.34/hr and the NYCTA, which pays \$15.56/hr to workers represented by the Amalgamated Transit Union, Local 100. The MBTA pays “Car Cleaners” 52.30% more (\$19.83/hr as opposed to \$13.02/hr) than Baltimore.

Using the National Transit Database, we compared the MBTA to a “peer group” of eight other transit authorities to assess the MBTA’s ability to control administrative

<sup>20</sup>See U.S. Bureau of Labor Statistics, *Collective Bargaining Agreements*, <http://stats.bls.gov/cbaccess.htm>.

costs and fringe benefits. We found that the MBTA allocates a relatively large share of its resources to administrative costs and a relatively small share to operations and maintenance. See Table 4. In 1997, the MBTA devoted the second lowest share (80.36%) of its resources to operations and maintenance, and the second highest share (19.64%) to administration. By this standard, only the New Jersey Transit Corporation performed worse than the MBTA.<sup>21</sup>

Table 4 - Operating Expense by Function and Object Class, 1999

<b>Transit Authority</b>	<b>Operations &amp; Maintenance/ Total Operating Exp.</b>	<b>Administration/ Total Operating Exp.</b>
NJTransit	77.03%	22.97%
<i>MBTA</i>	<i>80.36%</i>	<i>19.64%</i>
Baltimore	80.63%	19.37%
Washington	81.88%	18.12%
Detroit	82.09%	17.91%
Philadelphia	82.48%	17.52%
New York	85.78%	14.22%
Chicago	88.53%	11.47%
Pittsburgh	88.89%	11.11%
<b>Transit Authority</b>	<b>Fringe Benefits/ Total Operating Exp.</b>	<b>Other Expenses/ Total Operating Exp.</b>
<i>MBTA</i>	<i>30.91%</i>	<i>69.09%</i>
Detroit	29.40%	70.60%
Philadelphia	28.37%	71.63%
New York	27.76%	72.24%
Chicago	26.78%	73.32%
Washington	26.68%	73.32%
Baltimore	26.32%	73.68%
New York	27.76%	72.24%
NJTransit	25.31%	74.69%

Source: National Transit Database, 1997 Data Tables.

By another standard – the fraction of resources devoted to fringe benefits, rather than to salaries and materials – the MBTA performed the worst of the nine. About 30% of MBTA resources went into fringe benefits.

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<sup>21</sup>Data were available from the National Transit Database to determine Transit Operating Expense by Mode and Object Class as well as by Mode and Function for agency-operated services for 1997. Services contracted with private providers were excluded.

## Unfare Subsidies

MBTA fares have been historically low. A policy of keeping fares low is one of the causes of the expansion of deficits over the last 35 years. According to the latest survey conducted by the American Public Transit Association in 1997, the MBTA charges one of the lowest base fares for bus, subway and commuter rail in the country and has the lowest fares in comparison to those charged by the peer group of eight authorities.<sup>22</sup> See Table 5.

Table 5 - Adult Passenger Single-Trip Base Fares by Large Metropolitan Area, 1999

<b>Metropolitan Area</b>	<b>Bus</b>	<b>Subway</b>	<b>Commuter Rail*</b>
Nat'l average*	\$1.00	\$1.36	\$2.34
Boston	0.60	0.85	0.85
Peer average	1.33	1.38	2.60
New York	1.50	1.50	3.25
New Jersey	1.00	1.00	1.20
Chicago	1.60	1.60	3.15
Detroit	1.25	NA	NA
Philadelphia	1.60	1.60	2.50
Baltimore	1.35	1.35	3.25
Washington,DC	1.10	1.10	3.60
Pittsburgh	1.25	1.50	1.25

Source: 1999 BHI survey.

\*Source: 1997 APTA statistics.

Figure 3 shows that compared to its peer group, the MBTA collects a relatively small share of its revenues from fares. Also, fare revenue as a percentage of the MBTA's operating expenditures has fallen from 74% in 1964 to 25.4% in 1999. See Figure 4. This has led inescapably to the need for larger and larger state subsidies.

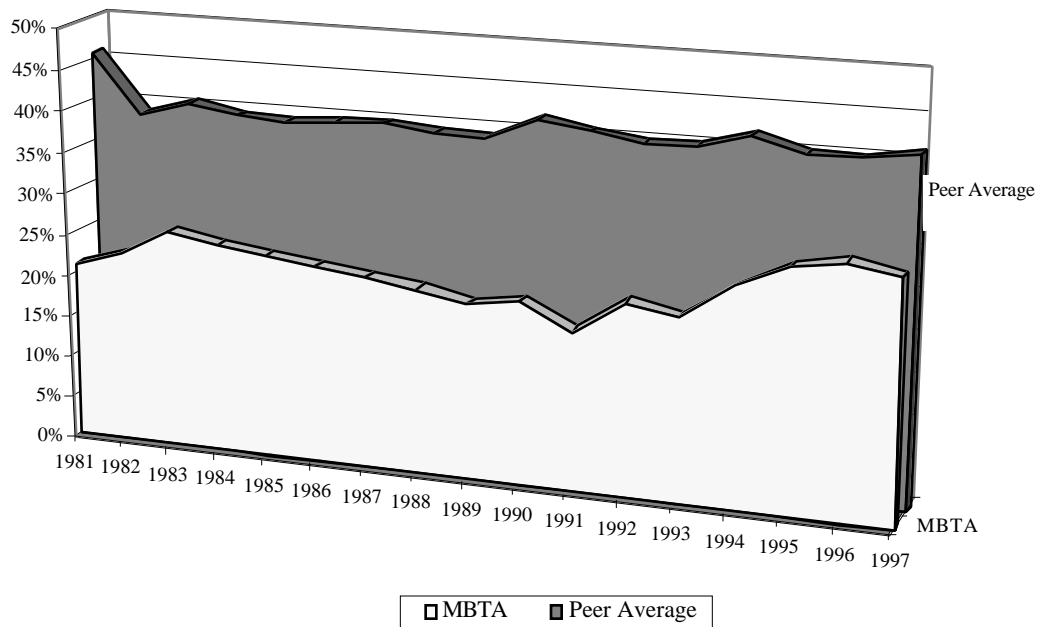
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<sup>22</sup>Calculations were based on data published by the American Public Transit Association <http://www.apta.com/pubs/stats/fares/fareavg.htm>. National average single trip base fares for buses was based on a survey of 261 transit systems, for heavy rail 13 systems, and for commuter rail 20 systems.

The Commonwealth's subsidy to the MBTA had increased substantially since the creation of the MBTA in 1964. After adjusting for inflation, the MBTA's deficit (defined as net cost of service) has increased 1060% or at an annual rate of 7.25% over the intervening 35-year period.

In 1998, Massachusetts paid \$528.7 million in subsidies or 78.4% of the MBTA's net cost of service. In contrast, the 1965 subsidy was 12%. Figure 5 shows how, adjusting for inflation, subsidies have increased in comparison to fare revenues since the 1970s.

Figure 3 - Fares as a % of Total Revenue, MBTA and Peer Average, 1981-1997



Source: National Transit Database, various years.

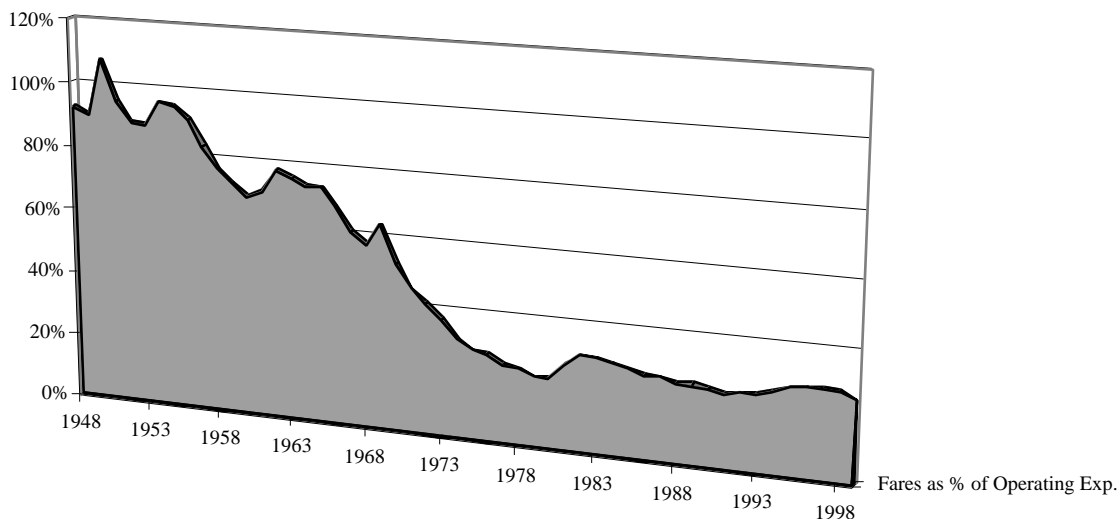
## Solutions

The state infrastructure crisis has prompted a variety of proposed solutions. There are arguments for delaying tax cuts, and for raising road and bridge tolls. There are

admonitions against Governor Cellucci’s proposal to cut the personal income tax from 5.95% to 5% on the theory that the state will need the budget surplus to alleviate the infrastructure crisis.<sup>23</sup>

One proposal would include the restoration of passenger vehicle registration fees, now in the process of being phased out. Another proposal would raise tolls from 50¢ to \$2 on the Boston extension of the Massachusetts Turnpike and from \$1 to \$4 on the harbor tunnels.<sup>24</sup> The state is also invited to consider new user fees and various alternative-financing methods that would make more capital spending possible.<sup>25</sup>

Figure 4 - MBTA Fare Revenue as a % of Operating Expenditures, 1948-1999



Source: MBTA financial statements.

All such proposals, however, give rise to questions of their own about fairness and about economic impact. Rejecting the proposed income tax cut means denying relief

<sup>23</sup>“Fiscal Ground Rules,” *Boston Sunday Globe*, April 11, 1999.

<sup>24</sup>Massachusetts Taxpayers Foundation, *Reaching the Breaking Point*, 32. The tolls are already slated to rise to \$1 and \$3, respectively, by 2002.

<sup>25</sup>*Ibid.* 32-33.

to taxpayers and losing an opportunity to create jobs and new capital spending in the state.<sup>26</sup>

Raising tolls seems to represent a particularly unfair option. As a result of bonds issued by the Massachusetts Turnpike Authority for the purpose of defraying CA/T construction costs, Massachusetts Turnpike drivers already pay 1.88 times the amount required to operate the Turnpike.<sup>27</sup>

In view of the MBTA's own very substantial capital needs and of the comparatively low fares and high subsidies and labor costs that characterize MBTA operations, it is not surprising that the Massachusetts legislature is considering a change in MBTA funding that would probably necessitate a fare increase. The argument for expecting the MBTA and its riders to share in the sacrifice being imposed on other constituencies seems indisputable.

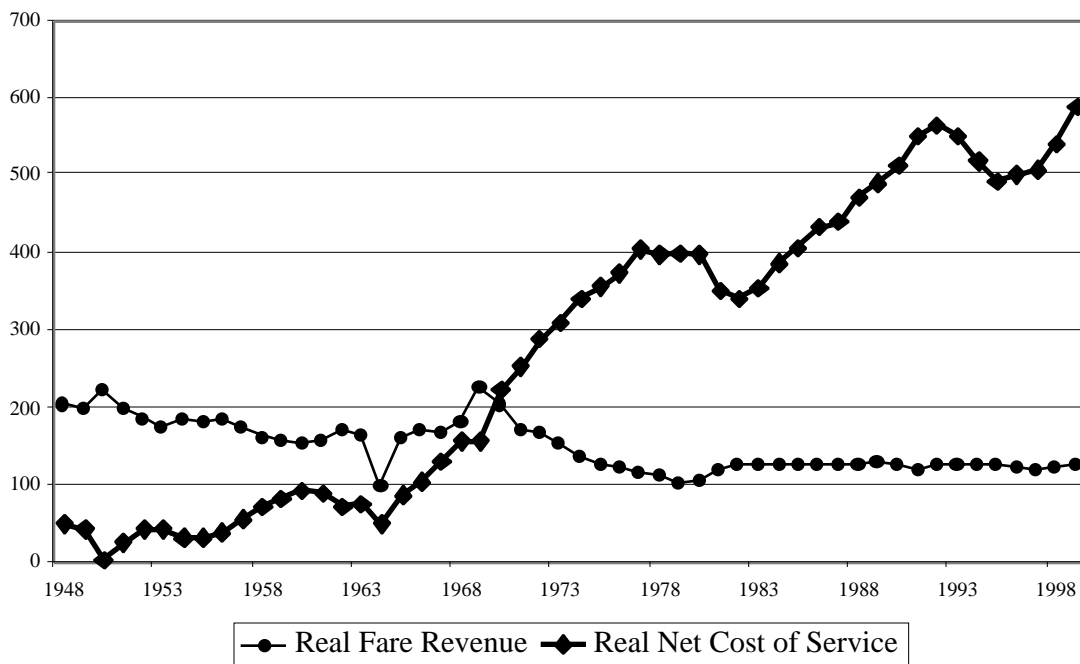
Figure 5 - MBTA Inflation-Adjusted Real Fare Revenue and NCS, 1948-1999

(\$ millions)

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<sup>26</sup>We estimate that reducing the tax would create 85,823 jobs.

<sup>27</sup>Estimated from MTA financial statements for 1995-1998.



Source: MBTA financial statements.

The task, however, is to rise above the current crisis and to frame a solution that will end permanently the dependence on ever-expanding public subsidies that has become a way of life for the MBTA.

The MBTA derives operating revenue from four principal constituencies – riders, state, federal and local governments. Federal operating subsidies were less than 1% of the MBTA’s 1998 budget. Federal grants as a share of total capital expenditure, as noted earlier, will fall to 35% by 2002. Thus, federal government contributions are not a source of possible new funding. State taxpayers already bear a disproportionate burden for funding MBTA operations and debt service.

As for local governments, the MBTA services 78 communities that pay assessments amounting to about 16% of MBTA revenues. As commuter rail services

have extended into the suburbs since 1964, the actual number of communities served by the MBTA has increased substantially, allowing many communities thus served to escape assessment.<sup>28</sup>

H-4400 would increase by 97 the number of new cities and towns assessed and reduce the contribution of the 78 currently-assessed MBTA district communities.<sup>29</sup> By 2006 the newly-assessed communities would pay a total of \$10.6 million, as the 78 communities' current total contribution would fall from \$141 million to about \$117 million. The bill would thus spread the local assessments over more communities, providing relief to those already assessed. While it would increase the number of communities assessed, this solution would not increase the total MBTA funding that comes from local assessments.

This leaves two options: (1) raising fares and (2) reducing costs through greater efficiency. We compared MBTA operating efficiency and cost-effectiveness ratios to the peer group of eight transit authorities and to nine of the 15 regional transit authorities operating in Massachusetts. We next compared the MBTA to the peer group for dependence on state subsidies. We then determined how much money Massachusetts taxpayers could save on average in 2000, if

1. the MBTA operated at least as efficiently as peer authorities and the RTAs;
2. the share of MBTA operating funds obtained from state subsidies were comparable to that obtained from state subsidies by peer authorities; and
3. the share of MBTA debt service funds obtained from state subsidies were reduced to reflect declining federal contributions to MBTA capital expenditures.

This saving would amount to \$217.24 million in FY 2000. See Table 6. Column A provides a range of estimated cost savings that the MBTA could enjoy if it provided bus service at a level of efficiency comparable to the peer group of eight transit authorities or to the Massachusetts RTAs. We found, for example, that if the MBTA

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<sup>28</sup>Massachusetts General Laws, Chapter 161/A.

<sup>29</sup>House Committee on Ways and Means, *Fiscal Year 2000 Budget Recommendations*, April 1999. Amendment 1188 was approved May 7, 1999.

Table 6 - Potential State Saving in MBTA Funding FY 2000

	(A) Bus (\$ million)		(B) Subway (\$ million)	(C) Overall (\$ million)	(D) Overall (\$ million)	(E) % Saved	(F) Saving (\$ million)
	Peer Group	Regional Transit Authorities	Peer Group				
Cost Saving	30.67	35.12	25.98	56.65-61.10 <sup>a</sup>	58.87	36% <sup>b</sup>	21.19
Subsidy Saving					635.00 <sup>d</sup>	18% <sup>c</sup>	114.30
Debt Service Saving					327.00 <sup>e</sup>	25% <sup>f</sup>	81.75
Total Saving							217.24

<sup>a</sup>(30.67 + 25.98) to (\$35.12 + 25.98).

<sup>b</sup>State share of MBTA funds for peer group.

<sup>c</sup>Current state share of MBTA funds - adjusted state share of MBTA funds = 0.54 - 0.36 = 0.18.

<sup>d</sup>FY 1999 MBTA operating budget, including supplemental appropriation.

<sup>e</sup>FY 1999 MBTA debt service.

<sup>f</sup>Proposed percentage reduction of state subsidy for debt service, obtained by subtracting the federal share of MBTA capital funds (65%) in 1986 from the expected 2002 share (40%): 0.60 - 0.35 = 0.25.

operated buses at the level of efficiency equal to that of the peer group authorities, it could reduce costs by \$30.67 million per year without reducing service.

Column B provides the estimated cost savings that the MBTA could enjoy if it provided subway service at a level of efficiency comparable to the peer group of eight transit authorities. The range of overall (bus and subway) savings is provided in column C. Column D provides the midpoint (\$58.87 million) of this range.

Because we want to determine the amount that the state could save through efficiency gains, we must determine the fraction of MBTA funds that the state would provide if it subsidized the MBTA at a rate comparable to the peer group of eight transit authorities. The FY 2000 baseline state-financed operating subsidy (the subsidy that would be provided without any change in funding) is projected to be 54% of total MBTA operating funds. We estimate that the state would reduce this fraction to 36% if Massachusetts subsidized the MBTA at a rate comparable to the rate at which states

subsidize the other eight.<sup>30</sup> We then calculate the saving to state taxpayers arising from efficiency gains at  $.36 * \$58.87$  million or \$21.19 million.

Under current law (the baseline scenario), total current budget and operating expenditures are projected to be \$962 million and \$635 million, respectively, in 2000 (the difference going to debt service).<sup>31</sup> If the state reduced its operating subsidy from 54% to 36%, or by 18 percentage points, Massachusetts taxpayers would save an additional \$114.30 million ( $= .18 * \$635$  million).

Before the CA/T project, the state's share of the capital budget was about 40%. This ratio will have risen by 25 percentage points to 65% by 2002. Given the explosive growth in MBTA service over the last ten years, it is reasonable for the state to reduce its contribution to MBTA debt service by 25 percentage points, from 100% to 75%. Multiplying  $.25$  by the debt service subsidy of \$327.00 million, we get a saving of \$81.75 million.

We can now add the individual cost savings to obtain the total saving to taxpayers. The savings are \$21.19 million in efficiency gain, \$114.30 million in operating subsidy savings and \$81.75 million in debt service saving for a total of \$217.24 million. By freeing up \$217.24 million per year in funds, the state could amortize \$2.662 billion worth of 20-year bonds paying 5.2%.

By increasing efficiency, the MBTA could reduce its 2000 funding requirements from \$962.00 million to \$903.13 million ( $= \$962.00$  million - \$58.87 million). Given a reduction of \$217.24 million in state subsidies and no change in local assessments or revenues from other sources, fare revenues would have to double, from \$162.00 million to \$320.37 million. Given the decrease in ridership that a fare increase could be expected to bring about, fares would have to rise by 124%.<sup>32</sup>

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<sup>30</sup>According to the National Transit Database, the fraction of funds received on average from state government, by the peer group of eight is  $.36$ , while the fraction received by the MBTA from state government is  $.54$ .

<sup>31</sup>Finance Committee, MBTA Advisory Board, preliminary FY 2000 budget request.

<sup>32</sup>We can present the problem as follows: The preliminary FY 2000 budget calls for MBTA funds to be obtained from four sources:

(1)  $S_b + F_b + L_b + O_b = \$962.00$  million, where  
 $S_b$  = projected state subsidy before reform = \$623.50 million,  
 $F_b$  = projected fare revenue before reform = \$162.00 million,  
 $L_b$  = projected local assessment before reform = \$144.50 million,

In summary, the state can save \$217.24 million a year in MBTA subsidies and, by doing so, fund an additional \$2.66 billion in new infrastructure spending if

1. the MBTA operates at the level of efficiency achieved by peer authorities and RTAs;
2. state subsidies were adjusted to reflect operating norms met elsewhere and declining federal subsidies to MBTA capital spending; and
3. the MBTA raises fares by 124%.

Table 6 shows that there is room for a fare increase. There will, however, be a number of objections to any fare increase. One consideration is the burden of a fare increase on low-income, elderly, disabled and student riders. Based on the MBTA's

$O_b$  = projected other sources of income (non-fare revenue + federal operating subsidy) before reform = \$32.00 million.

The revised budget under the change proposed here is

(2)  $S_a + F_a + L_a + O_a = \$903.13$  million, where

$S_a$  = state subsidy after reform = \$623.50 million - \$217.24 million = \$406.26 million,

$F_a$  = fare revenue after reform,

$L_a$  = local assessments after reform,

$O_a$  = other sources of income after reform.

Of the three sources of revenue (fares, local assessments and other) that could be expanded to bring total revenue to \$903.13 million, the source that is most expandable is fares. As pointed out earlier, the increase in the number of localities assessed to 97 is not expected to raise more money. The current proposal merely spreads the existing assessment burden over more communities. As for other sources of revenue, they consist mainly of parking fees, investment income and federal grants. While parking fees would seem a target for increases, this category represents a relatively small share of total funds and therefore not a particular lucrative source on which to draw.

Therefore setting  $L_b = L_a$  and  $O_b = O_a$ , the new fare revenue that must therefore be raised is

(3)  $F_a = \$903.13$  million -  $S_a$  -  $L_a$  -  $O_a$   
 $= \$903.13$  million - \$406.26 million - \$144.50 million - \$32.00 million  
 $= \$320.37$  million.

This represents a  $98\% = \left[ \left( \frac{320.37}{162} \right) - 1 \right] * 100\%$  increase, or doubling of fare revenue.

Because ridership decreases with fares, fares would have to be raised by more than 98% in order to generate a 98% increase in fare revenue.

To estimate the required increase in fares, we turn to MBTA data pertaining to ridership changes that took place after the MBTA increased systemwide fares by about 12% on October 1, 1991. According to these data, the fare increase brought about a recession-adjusted decline in ridership of between 1.4% to 3.7%. See Massachusetts Bay Transit Authority, *MBTA Environmental Impact Report on the 1991 Fare Increase, Supplemental Draft*, January 1993, 1-12.

Taking the midpoint (2.55) of this range, demand for MBTA services falls by  $.21\% = (2.55 \div 12)\%$  for every 1% increase in fares. We then estimate the required percentage change increase in fares to be  $124\% = \left[ 0.98 \div (1 - 0.21) \right] * 100\%$ .

environmental impact report, low-income groups made up about 14.8% of all riders after the 1991 fare hike.<sup>33</sup>

Some economic data have a bearing on this argument. Owing, for example, to the strong performance of the state economy, the annual average rate of unemployment was 3.3% in 1998, the lowest level since 1988. In 1998, the growth rate of inflation-adjusted per capita income was the second highest in the nation and Massachusetts had the third highest per capita income, 23% above the national average.<sup>34</sup> There is encouraging news about low-income residents of the state as well. A recent long-term study of former welfare recipients found that 71% of the respondents had full-time work earning an average gross monthly wage double the amount of a typical cash grant on welfare of \$579.<sup>35</sup> It seems that a system-wide fare hike may not impose an extraordinarily heavy financial burden on riders.

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<sup>33</sup>Massachusetts Bay Transportation Authority, *MBTA Environmental Impact Report on the 1991 Fare Increase*, MBTA Supplemental Draft January 1993. Calculation was based on Table 8, 1-16.

<sup>34</sup><http://www.magnet.state.ma.us/econ/keyindic.htm>.

<sup>35</sup>Jordana Hart, "Ex-state welfare recipients living better, survey finds," *Boston Globe, Metro/Region*, 17 April 1999.

## RECOMMENDATIONS

There are a number of steps the state can take to increase MBTA efficiency.

### Repeal Chapter 296 of the Acts of 1993

The state can repeal Chapter 296 of the Acts of 1993, popularly called the “Pacheco bill.” The statute purports to impose reasonable limitations on the privatization of state services but actually prevents competition in public procurement.

In 1996, the MBTA attempted to contract bus services to private providers. In 1997, after receiving bids for 40% of its bus operation, the MBTA submitted the proposed contract to the state auditor. Estimated savings from private procurement were \$23.1 million over five years for the Charlestown and Quincy garages. On the basis of the Pacheco bill, the State Auditor twice denied the MBTA’s request for privatization.<sup>36</sup>

Repeal of the Pacheco bill would be a step toward increased efficiency in MBTA operations. Opening MBTA procurement to competition would put a downward pressure on costs, making it possible to reduce state subsidies and to moderate fare increases.

### Raise state subsidies by changes in ridership and the CPI

Beyond raising fares the agency’s financing structure must be changed in order to constrain managers to cut costs. As has been widely recommended, the legislature should substitute “forward funding” for “backward funding” of MBTA expenses. That simply means requiring the MBTA to operate under the same budget constraint as other public and private entities and holding MBTA managers accountable for their ability to operate within that constraint.

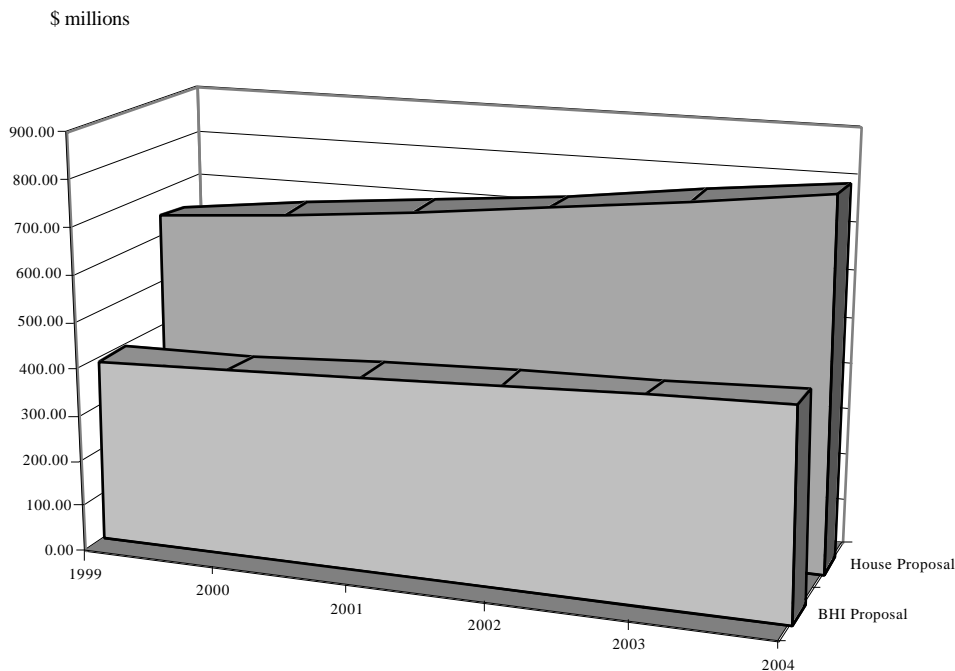
In contrast to the House proposal, we recommend that the MBTA budget grow with ridership, as a direct measure of consumer demand for transit services, and with the

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<sup>36</sup>The Commonwealth of Massachusetts, Auditor of the Commonwealth, *Letter from the State Auditor to Patrick J. Moynihan, General Manager of the MBTA*, May 16, 1998.

consumer price index. Taking into consideration the growth rate of the CPI for large metropolitan areas and MBTA ridership of the last decade, we recommend that the MBTA subsidy grow by 2.7% annually for the next five years. In contrast, taking into consideration the expected growth of sales tax revenue, the subsidy would grow at an annual rate of 4.4% under H-4400. See Figure 6.

Figure 6 - House v. BHI State Subsidies, 1999-2004



Under our proposal, the subsidy would grow from \$406.26 million in 2000 to \$453 million in 2004. Under the House proposal, on the other hand, the subsidy would grow from \$660 million to \$819 million. Thus in just a few years the House proposal provides for roughly double the subsidy that the MBTA would need in order to bring fares and costs into line with norms met by other transit authorities.

Dedicating a substantial share of sales tax revenue stream to the MBTA should not be considered as a *quid pro quo* for ending backward funding. The only way to instill discipline into MBTA operations is to limit the state subsidy to a given fraction of total funding and costs, as proposed above, and index its growth to the consumer price index.

## Increase fares by 124%

Increase fares immediately by 124 % across the board to bring MBTA fares into line with those paid by other mass transit users around the country. MBTA bus fares would increase to about \$1.35 and subway fares to \$1.90. These increases would, at first, make MBTA fares among the highest in the country. If the MBTA were able to achieve further cost reductions the fare increases proposed here could be moderated.

## APPENDIX : PERFORMANCE OF TRANSIT AUTHORITIES

We used statistics provided by the National Transit Database to compare the financial performance of the MBTA with that of comparable transit authorities elsewhere in the country and with regional transit authorities in Massachusetts. We used time series data relating to MBTA and “peer” authority performance for 1979 (the first year financial and traffic data were systematically tabulated and published by the Federal Transit Administration) through 1997.

### Accounting and Data Collection Issues

The task of making efficiency comparisons between transit authorities offers a number of challenges. Accounting rules and practices may differ from one transit authority to another. Reporting requirements set by the Federal Transit Administration differ from the authorities’ own accounting rules. FTA officials indicate that individual authorities often fail to follow reporting guidelines.

There are a number of widely recognized obstacles to measuring performance, given such data as may be found.<sup>37</sup> Operating expenses may contain overhead charges whose distribution over modes of operation is at the discretion of the various transportation authorities. In recent years, the National Transit Database has allowed capitalization of some costs that were formally reported as operating expenses. This practice is likely to understate operating cost and thus overstate performance.<sup>38</sup> Despite its shortcomings, the National Transit Database can be a useful tool for measuring and comparing performance.

### Choice of Peer Group Authorities

The MBTA is the 10th largest mass transit authority in the country, as measured by the population of the metropolitan area served. It is a multi-modal provider, operating a wide array of services including fixed-schedule bus, demand-response bus, subway, commuter rail, light rail, and commuter boat services. The MBTA serves a population of

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<sup>37</sup> D. T. Hartgen and E. L. Presutti, *Resource Versus Results: Comparative Performance of State Highway Systems: 1984-1996*, Seventh Annual Report, p.53.

<sup>38</sup> Federal Transit Administration, *1997 National Transit Database*, Introduction, <http://www.ntdprogram.com/NTD/NTDDData.nsf/1997+TOC/?OpenView&count=50>.

2,608,638 in 78 cities and towns with an area of 1,038 square miles, providing transportation through a system of 155 bus routes, 3 rapid transit lines, 5 streetcar routes, 4 trackless trolley lines and 13 commuter rail routes. On an average weekday, about 1.1 million passengers use the MBTA.<sup>39</sup>

A comparison of MBTA performance with that of the largest transit authorities, while straightforward, would be misleading for several reasons. Economies of scale and scope associated with size of geographic area and mode of operation will, along with other characteristics, influence cost and performance. The age of the system – especially that of the subway component – and the bargaining power of local unions, as well as weather conditions, will influence costs. We thus employed a variety of criteria to identify peer group authorities:

- size of the metropolitan area served;
- variety of transportation services offered;
- age of the system;
- influence of unions in setting corporate policy; and
- weather conditions.

Table 7 shows four out of the five criteria for peer group selection. The second column ranks the metropolitan areas served by size of population. “Year established” indicates the year in which the existing transit authority was established. Most of the authorities went into service long before they were organized in their current form. The MBTA was established in 1964, but North America’s first subway service, now part of the MBTA, opened in Boston in 1897. In New York, subway service opened in 1904, in Philadelphia in 1902, in Chicago in 1951, in Washington D.C. in 1976 and in Baltimore in 1983.

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<sup>39</sup> See MBTA website, <http://www.mbta.com>.

Table 7 - Peer Group Authorities for Bus Operation

Authority	Pop. Rank	Year Established	Unions	Bus	Subway	Comm. Rail
NYCTA	1	1953	Very influential	Yes	Yes	No
NJ Transit	1	1979	Influential	Yes	No	Yes
Chicago CTA	3	1947	Very influential	Yes	Yes	No
SEPTA (Phil.)	4	1968	Very influential	Yes	Yes	Yes
Detroit DOT	5	1974	Very influential	Yes	No	No
WMATA (DC)	7	1960	Very influential	Yes	Yes	No
MBTA	10	1964	Very influential	Yes	Yes	Yes
Baltimore MTA	17	1961	Influential	Yes	Yes	Yes
Pittsburgh	20	1960	Very influential	Yes	No	No

Source: Federal Transit Administration, *1995 National Transit Database*, Introduction, <http://www.fta.dot.gov/library/reference/sec15/1995/header/index.html> and interviews with transit operators.

The MBTA’s workforce is heavily unionized. One of its largest unions, ATU Local 589, signed a “sweetheart deal” with management on October 11, 1998.<sup>40</sup> According to this agreement 60% of the MBTA’s total work force will receive an 18% pay hike over five years.

The deal also sets up obstacles to privatization. It guarantees that no local union member would lose his job due to privatization, or if he did, that he would receive a severance package equivalent to two years salary and benefits. It also delays the elimination of the MBTA’s costliest healthcare package for several years. The agreement protects the jobs of token collectors even as the MBTA makes new investments in automatic turnstile equipment.<sup>41</sup>

Thus, one criterion for selection was that unions were at least “influential” in determining labor agreements. Unions were identified as “influential” or “very influential” according to their importance in determining worker compensation, as learned from interviews with authority administrators.

Other factors were a large service area, a similar mix of services (all but Pittsburgh and Detroit provide at least two of the three services), weather (all serve

<sup>40</sup> For more details see Laura Brown: “MBTA board expected to OK sweetheart union contract”, *Boston Herald*, Oct 15, 1998, p.24.

<sup>41</sup> Memorandum of Understanding between the Massachusetts Bay Transportation Authority and Local 589, Amalgamated Transit Union, AFT-CIO, October 1998.

northern cities) and age of the subway system (all but Washington, DC and Baltimore are at least about 50 years old).

We chose the following eight mass transit authorities as peer group members for MBTA bus operations and a subset of these for subway operations.<sup>42</sup>

- Peer group members for bus operations: New York MTA-New York City Transit Authority (NYCTA), New Jersey Transit Corporation, Chicago RTA-Chicago Transit Authority, Philadelphia–Southern Pennsylvania Transportation Authority (SEPTA), City of Detroit Department of Transportation, Washington Metropolitan Area Transit Authority (WMATA), Maryland Mass Transit Administration (Baltimore), Pittsburgh - Port Authority of Allegheny County.
- Peer group members for subway operations: NYCTA, SEPTA, Chicago, Baltimore, and Washington, DC.

The study focuses on operating and cost effectiveness ratios for two major types of operation: bus and heavy rail (subway). These two areas were the most important ones, accounting for about 71.4% of total revenue and 64.0% of operating expenses in 1997. See Table 8.

## **Financial and performance measures**

The study utilizes four performance measures in two major spending categories: operating efficiency and cost effectiveness. We used two measures of operating efficiency: Operating Expense/Vehicle Revenue Hour (OE/VRH) and Operating

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<sup>42</sup> Ratios for bus services only reflect expenses associated with fixed-schedule service. Demand response, or dial-a-ride services are not included.

Table 8 - Share of MBTA Total Revenue and Expenditure by Mode, 1997

Share of Total Revenue	1997
Bus	25.3%
Subway	46.1%
Commuter rail	25.0%
Total	96.4%
Share of Operating Expenses	1997
Bus	34.0%
Subway	30.0%
Commuter rail	21.4%
Total	85.3%

Source :MBTA Budget Office, Sep. 1998

Expense/Vehicle Revenue Mile (OE/VRM). OE/VRH is defined as the amount it costs the transit authority per hour to operate its vehicles in passenger (i.e., revenue generating) service. Downtime and travel in non-passenger service are excluded. Similarly, OE/VRM is the cost per mile to run a vehicle in passenger service. Both OE/VRM and OE/VRH measure vehicle utilization. The lower the ratios, the better vehicle utilization and the better performance, that is, the less it costs to operate a vehicle per mile or per hour.

We use two measures of cost effectiveness: Operating Expense/Unlinked Passenger Trip (OE/UNLTRP) and Operating Expense/Passenger Mile (OE/PM). OE/UNLTRP is the cost of carrying one passenger on one unlinked trip in the system. Similarly, Operating Expense/Passenger Mile indicates how much it costs to carry one passenger a mile in the system. The lower the ratio the better the performance.

The number of unlinked passenger trips is defined as the number of passengers who board public transportation vehicles. A passenger is counted as taking an unlinked trip each time he boards a vehicle even if he uses more than one vehicle for a single journey. If a passenger boards the Red Line at Alewife and transfers at Park Street to the Green Line to get off at Government Center, that passenger is counted as having taken two unlinked trips. MBTA statistics show that the average number of unlinked trips of passengers on surface and rapid transit lines is 1.4<sup>43</sup>.

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<sup>43</sup> Massachusetts Bay Transportation Authority, *Performance Report*, various issues.

No single service efficiency or cost effectiveness ratio should be viewed in isolation. Different transit authorities vary according to size of the geographical area covered, frequency of service on weekdays and weekends, and number of transfers passengers have to take to get to their final destination. It is sensible, therefore, to consider an average of the four ratios, rather than a single ratio in isolation, in comparing performance.

### **MBTA v. Peer Group Performance**

We determined how much money could be saved by mode of operation in 2000, if the MBTA operated at least as efficiently as peer group authorities. First we collected and tabulated OE/VRM ratios for fixed-route bus operations for each of the eight peer group authorities as well as for the MBTA from 1979 through 1997. Then we calculated  $OE/VRM_p$  for the peer group of eight for each consecutive year. Where  $i = 1 \dots 8$  the number of peer group authorities,  $j = 1 \dots 19$ , the number of years, 1979 through 1997,

$$1. \quad OE/VRM_j^p = \sum_{i=1}^8 [OE/VRM_{i,j}] / 8.$$

Then we obtained  $OE/VRM_t$  (OE/VRM for the MBTA) for each consecutive year and subtracted  $OE/VRM_t$  from  $OE/VRM_p$  to determine if:

$$2. \quad D_j \equiv OE/VRM_j^p - OE/VRM_t^j < 0, \text{ where}$$

“D” measures the amount by which the MBTA could reduce the cost of providing a revenue mile of bus service if it performed as efficiently as the peer group. A “D” less than zero indicates that the MBTA delivered each VRM less efficiently, i.e., at a greater expense than that of the peer group.

Then we multiplied the difference in peer and MBTA performance, D, by the number of vehicle revenue miles in bus operations carried out by the MBTA ( $VRM_t$ ) to obtain

$$3. \quad S_j = D_j * VRM_t^j$$

to arrive at total dollar savings,  $S$ , for each year. Finally we divided the savings for each year by total operating expense for buses to obtain:

4.  $\% \text{ saving}_j = S_j / \text{TOE}_j.$

We performed similar calculations for the remaining three performance ratios, i.e. for OE/VRH, OE/PM, and OE/UNLTRP for each year. Then we calculated the average of the four “% saving” figures for each year. Since data for all authorities were available from the National Transit Database only through 1997, we had to estimate the % saving for FY 2000. Our estimate, computed as the average % saving over the last eight years (1990-1997), is 13.8%. Taking this ratio and multiplying it by the preliminary operating expense for bus operations for FY 2000, we arrive at a total saving of \$30.67 million (=  $0.350 * .138 * \$635$  million) for fixed-route bus operations.

Next, we performed the same calculations for subway operations and estimated that the MBTA could save 13.2% of its FY 2000 operating budget for subways, or \$25.98 million (=  $0.31 * 0.132 * \$635$  million). See Table 6.

## **MBTA v. RTA Performance**

Outside the 78-member MBTA district, 15 regional transit authorities (RTAs) provide public transportation in Massachusetts.<sup>44</sup> The RTAs were established in 1973 as political subdivisions of the Commonwealth.<sup>45</sup>

The RTAs serve 52% of the Commonwealth’s 6 million residents and employ about 2,000 people at 190 different transportation organizations..<sup>46</sup> They serve both rural and metropolitan areas and offer a variety of transit services ranging from fixed-route bus services for the general public to dial-a-ride transportation for elderly and disabled patrons. Today 215 of Massachusetts’ 351 cities and towns are part of the RTA

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<sup>44</sup> The network of 15 RTAs consists of Berkshire RTA, Brockton Area Transit Authority, Cape Ann Transportation Authority, Cape Cod RTA, Franklin RTA, Greater Attleboro-Taunton RTA, Greenfield-Montague Transportation Area, Lowell RTA, Martha’s Vineyard TA, Merrimack Valley RTA, Montachusets RTA, Nantucket RTA, Pioneer Valley TA, Southeastern Regional TA, Worcester RTA.

<sup>45</sup> Chapter 1141 of the Acts of 1973.

<sup>46</sup> Massachusetts Association of Regional Transit Authorities, *RTA Transit Needs and Funding Analysis, Final Report*, prepared by Multisystems and KKO & Associates, May 15, 1996

network.<sup>47</sup> In 1997, MBTA buses carried 3.8 times as many passengers as RTAs, 103.9 million vs. 27.5 million, respectively.<sup>48</sup> Yet, the state subsidy was 6.19 times higher for MBTA fix-route bus operations than for the RTAs. The MBTA subsidy per trip was \$1.54; the RTA subsidy was \$0.94.<sup>49</sup>

The RTAs are subdivisions of the Commonwealth with rights, obligations, financing structure similar to those of the MBTA. In 1973, however, the legislature provided for certain controls that have helped curb the growth of RTA deficits. These include greater local control over network design and development, fostering financial responsibility by RTA administrators and city and town managers. In contrast to the MBTA, the RTAs are prohibited from directly providing services.<sup>50</sup> They contract with local private bus companies, nonprofit firms or national transportation organizations.

This prohibition gives the RTAs a cost advantage over the MBTA by inducing them to minimize overhead. The RTAs have not become large bureaucracies. A typical RTA has only an administrator and a few support personnel to manage contracts. Moreover, RTA services are open for competitive bidding every 3-5 years, permitting their managers to take full advantage of price competition between private providers.

Cities and towns may decide whether to join or disjoin a transit authority by simple majority vote at regular elections in light of the level and quality of service they desire. City managers are members of the RTA advisory board that designs network configuration and schedules based on local needs. Communities have full control over the contracting process. They pay for the service they receive and nothing else. If communities elect to receive no service, they are not assessed for operating costs. The RTAs, as a result, are required to operate on a budget.

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<sup>47</sup> Ibid.

<sup>48</sup> Federal Transit Administration, *1997 National Transit Database*, Introduction, <http://www.ntdprogram.com/NTD/NTDData.nsf/1997+TOC/?OpenView&count=50>. Calculations were based on the number of unlinked trips per year.

<sup>49</sup> In 1997 RTAs received \$36.3 million in state subsidy for bus operations including paratransit services. RTAs on average spent 71% of that amount on fixed route bus operations, or about \$25.77 million. The MBTA received a total of \$483.2 million in state subsidy. Since bus operations accounted for 33% of all operating expenditure at the MBTA in 1997, the estimated subsidy for bus operations was about \$159.5 million. Since both the MBTA and the RTAs serve about 3 million residents, the state subsidy per unlinked trip comes to of \$0.94 for RTAs and \$1.54 for the MBTA.

<sup>50</sup> Chapter 1141 of the Acts of 1993 Section 25. "Nothing in this chapter shall be deemed to authorize or permit any authority established by this chapter to directly operate any mass transportation service".

Each year when RTA administrators and local officials convene to decide next year's service configuration and budget, town managers request services based on available property tax revenues. Each year the net cost of service in excess of income (the amount remaining after the deduction of federal operating subsidies, fare revenues and revenues from commercial activities) is divided between the state and the localities, with the state paying 75% of the net cost of service and localities the remaining 25%. While the state therefore subsidizes RTA operations, the localities have an incentive to reduce costs.

Our analysis considered only 9 of 15 RTAs because data reported to the federal government were sporadic or did not exist for six authorities for several years, preventing us from obtaining meaningful time series trends for analysis. See Table 9.

We determined how much the MBTA could save in 2000, if it operated at least as efficiently as the RTAs. In order to compare MBTA and RTA performance, we controlled for differences in authority size, based on fleet size and service frequency.

The RTAs belong to four distinctive fleet size categories based on the number of vehicles they own or lease. These are (1) fewer than 25 vehicles, (2) 25-49 vehicles, (3) 50-99 vehicles, and (4) 100-250 vehicles. We computed an RTA performance ratio for each fleet size, over the period 1979 to 1997.<sup>51</sup>

Data for authorities with fleets of fewer than 25 vehicles exist only for 1980-1986. Since all authorities under that category grew in size over the years, they were added to a larger fleet size as they expanded. For example, Berkshire RTA had fewer than 25 vehicles between 1980-1986. In 1987, it was moved into category (2), having reached a fleet size of 25-49. In 1988 and subsequent years, it fell into category (3), with 50-99 vehicles. The same regrouping was performed for each RTA for each year.

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<sup>51</sup> Performance averages for fleet sizes smaller than 1,000 vehicles were discontinued in 1990. For years after 1990, we used a three-year moving average to calculate performance averages for small fleet-size categories.

Table 9 - Regional Transit Authorities

RTA	Population	Ranking by Population	Fleet size (# of Vehicles)
Pioneer Valley	532,747	57	148
Worcester	315,666	82	209
Greater Attleboro	846,293	38	2
Lowell	181,651	139	52
New Bedford	139,082	171	100
Brockton	160,910	153	89
Merrimack Valley	237,632	111	81
Montachusets	82,249	260	129
Pittsfield-Berkshire	55,047	370	88

Source: Federal Transit Administration, 1997 *National Transit Database*, <http://www.ntdprogram.com/NTD/NTDDData.nsf/1997+TOC/?OpenView&count=50>.

After assigning each regional authority to one of the four groups listed above, we obtained operating efficiency ratios (OE/VRH and OE/VRM) as well as cost effectiveness ratios (OE/PM and OE/UNLTRP) for each authority from the National Transit Database. Next we obtained the national average performance ratio for each fleet size given by the NTD. Then we obtained performance ratios for the MBTA and the national average for authorities with large MBTA-size fleets.

Then we calculated the total operating expense for Massachusetts RTAs assigned to various fleet sizes by multiplying their service performance ratios by actual services delivered (VRH and VRM) and consumed (PM and UNLTRP), respectively:

For example, total operating expense for delivering vehicle revenue hours for category (4) in 1997 was computed as

$$5. \text{TOE}_{\text{RTA}} = \text{OE/VRH}_{\text{Pioneer V}} * \text{VRH}_{\text{Pioneer V}} + \text{OE/VRH}_{\text{Worcester}} * \text{VRH}_{\text{Worcester}} \\ + \text{OE/VRH}_{\text{Montachusets}} * \text{VRH}_{\text{Montachusets}} + \text{OE/VRH}_{\text{New Bedford}} * \text{VRH}_{\text{New Bedford}}$$

Next we multiplied  $\text{TOE}_{\text{RTA}}$  by the national average OE/VRH for MBTA-size fleets divided by the national OE/VRH for category (4) in 1997. Hypothetically, this shows the total operating expense that the MBTA would have incurred if it had provided a vehicle revenue hour of service at the same cost as the average authority in category (4), adjusting for differences in fleet size.

We next computed the same measure for each fleet size and for each year and divided this number by the total vehicle revenue hours provided by the RTAs, giving us the hypothetical cost per vehicle revenue hour, call it  $HOE/VRH_t$  for the MBTA. This *hypothetical* cost per vehicle revenue hour then offers a point of comparison with the *actual* cost per vehicle revenue hour,  $OE/VRH_t$ , for the MBTA.

We deducted  $HOE/VRH_t$  from  $OE/VRH_t$  to obtain the hypothetical saving per vehicle revenue hour, i.e., the amount that the MBTA could have saved per hour for a given year if it had provided vehicle revenue hours as efficiently as the RTAs. Multiplying this unit savings by the number of MBTA vehicle revenue hours yielded what we may call the total hypothetical dollar saving that the MBTA could enjoy if it operated at RTA-levels of efficiency. Abbreviate this as “HMBTA.” We then repeated this procedure for the remaining performance ratios.

To obtain the fraction of MBTA operating expenses that could be saved if the MBTA operated as efficiently as the RTAs, we averaged the HMBTAs obtained from the four performance ratios for 1990-1997 to get average HMBTA. For each year, we divided this average HMBTA by MBTA bus operating expenses. We then averaged the resulting ratios to get our final cost saving ratio. This ratio is 15.80%, equal to the estimated fraction by which the MBTA could reduce bus operating costs if it performed at the efficiency level of the RTAs. Multiplying this fraction by estimated FY 2000 MBTA bus operating costs, or \$222. million, we get an estimated saving of \$35.12 million.

By performing these calculations, we obtained a range of savings of \$30.67 - \$35.10 million for fixed-route bus operations, if the MBTA operated at least as efficiently as its peer group or RTAs in Massachusetts. Savings from subway operations amount to \$25.98 million in 2000. Next we added savings that can be realized in bus operations to those in subway operations to arrive at a range of savings of  $\$30.67 + \$25.98 = \$56.65$  million and  $\$35.10 + \$25.98 = \$61.08$ . Then we calculated the average of the above range of savings to get  $(\$56.65 + \$61.08)/2 = \$58.87$  million. See Table 6.

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