
Special Report



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Regional Transit Again A Look at the New Plan

I. Introduction

On May 31, the board of the Central Puget Sound Regional Transit Authority (RTA) adopted a regional transit system plan to be placed before the voters on November 5. RTA estimates that it would spend \$3.9 billion (1995\$) between 1997 and 2006 to implement the proposal. The Authority would impose two new local taxes, a sales tax of 4/10 of one percent and an annual motor vehicle excise tax (MVET) of 3/10 of one percent. RTA hopes that federal grants will cover almost 20 percent of the 10-year cost. To complete the funding, RTA intends to borrow more than \$1 billion.

This will be the second RTA proposal to go before the voters. The previous proposal, with an estimated cost of \$6.7 billion (1995\$) over 16 years, was rejected on March 14, 1995 by a 7 percent margin. Support for the plan concentrated in Seattle (excluding West Seattle) and northwest King County.

The new plan culminates a process that began in 1990, when Metro, Pierce Transit, Community Transit, the Snohomish County Transportation Authority, and the Washington State Department of Transportation formed the Joint Regional Policy Committee (JRPC). In June 1993, JRPC adopted its Regional Transit System Plan. This plan proposed \$8.3 billion (1995\$) in capital spending through the year 2015 to create two distinct regional rail systems.¹ The first system, Commuter Rail, connected Everett, Seattle, Renton, and Tacoma with diesel trains running on existing freight tracks. The second system, dubbed Rapid Rail by JRPC, connected these four cities, as well as Bellevue and Redmond, with high speed electric trains running primarily in exclusive rights-of-way.

In the summer of 1993, Snohomish, King, and Pierce counties formed the RTA, which began to develop a specific proposal for voters from the JRPC plan.

Public reaction to the JRPC plan indicated little enthusiasm for so expensive a project. As a result, RTA decided to seek voter approval for construction in phases. The Phase 1 proposal presented to voters last year extended through 2010 and included \$4.6 billion (1995\$) in rail capital costs. It would have imposed the same local taxes, 4/10 of one percent on sales and 3/10 of one percent MVET, as the current proposal. Last year's proposal, however, assumed a lower annual rate of federal grants and relied less on borrowing.

The core of the program was a 68.7 mile light rail system, running from Tacoma through downtown Seattle to south Snohomish County with a branch from Seattle through Bellevue to Overlake. To hold down costs, much of the system south and east of downtown Seattle would have been on surface streets.

With the voters' rejection of that plan, RTA was forced to reduce its workforce. Tom Matoff resigned as executive director and was replaced by Bob White. In October 1995, the Board called for the formation of a Regional Outreach Committee, with business and civic leaders as members, to help shape a new proposal. Dick Ford chaired this committee.

In late March of this year, RTA issued a draft 10-year plan with an estimated 10-year cost of \$3.7 billion (1995\$). This new draft offered several significant concessions to critics of the original proposal: It required a smaller initial commitment from taxpayers; it increased from 8 to 21 the number of RTA supported express bus routes; and it funded investments to expand and refine the region's HOV network to enhance bus service.

This draft formed the basis for the proposal adopted May 31. There were, however, several significant late changes. Most notably, the Seattle light rail segment was extended nine miles to south Sea-Tac, at an additional cost of \$315 million (1995\$), while the bus system was pruned. Funding for a study of the SR-520 corridor across Lake Washington was eliminated, as was RTA funding for the construction of HOV lanes.

The new proposal contains six major elements: (1) RTA funding of direct access ramps for the region's network of High Occupancy Vehicle (HOV) lanes; (2) a network system of 20 regional bus routes; (3) rush-hour commuter rail service connecting Everett, Seattle, Tacoma, and Lakewood; (4) a "starter" light rail system running from South Sea-Tac through downtown Seattle to the University District; (5) a program of investments—called "community connections"—to provide transit and rail stations, transit centers, and park-and-ride lots across the region; and (6) fare integration among the regions various transit modes and providers, so that a single trip will require only a single ticket from start to finish.

The majority of the outreach committee endorsed the plan. In the words of Dick Ford, the chair, "We cannot solve the mobility problem if we assume that there is only one solution. We hope that the public will understand that this plan is one part of a bigger solution."² But support was not unanimous. Committee member Emory Bundy, for one, issued a vigorous dissent. "The financial ability of the community to subsidize transit operations is inherently limited, as is its political willingness. It is essential, therefore, that further capital investments and subsidies for transit operations be prudently undertaken, and that money spent result in commensurate expansions in service. That is a standard that the RTA's current proposal fails to meet, by a great margin."³ Bundy had asked ECONorthwest to review the costs and benefits that the RTA had claimed for the draft plan. The firm reported: "According to our review, the present value of the costs of the project exceed the present value of the benefits by \$1 billion. In other words, the region would be worse off by \$1 billion if the RTA built the system than if it did nothing at all."⁴

Ultimately, the board passed the plan with a 15 to 2 margin. King County Executive Gary Locke's words exemplified the thinking of the majority, "We simply have to act, because every year of inaction will only aggravate our transportation gridlock and ultimately hurt our economic vitality and our environmental quality of life." The two negative votes came from King County Council members Jane Hague and Rob McKenna. McKenna explained, "I don't think it's going to reduce congestion significantly."

Acceptance of the RTA proposal will represent a major financial commitment for the region, increasing regional spending on public transit for the next 10 years by about 75 percent over the Puget Sound Regional Council's (PSRC) baseline projection. It is the first step toward a much grander (and more expensive) vision under which high capacity public transit would link the region's major centers. Manifestly there are limits to the public's willingness to tax itself. Moneys for public transportation investments are scarce today and will remain scarce in the future. The question is whether the RTA proposal is the best use of these scarce resources.

II. Details of New Plan in Contrast with Old Plan

The costs of the new RTA proposal are summarized in Figure 1, while the costs of last year's proposal are presented in Figure 2. In both cases costs are measured in 1995 dollars. Some caution must be taken in comparing these costs, however, since the numbers for the new proposal include only 10 years of interest and operating expenses rather than the 16 years that are included for the old proposal.

The last proposal failed because the majority of voters believed that the benefits of the system to them did not justify the costs. The new proposal was carefully designed to overcome those perceptions. The stated price tag was held down by requesting immediate approval of only 10 years of construction, rather than 16 years. Further, the RTA district was partitioned into five subareas, Snohomish County, Pierce County, north King County, south King County, and east King County. The revenues raised within each would be spent for that subarea's specific benefit.

Figure 1	
RTA Spending	
November 1996 Proposal,	
10-Year Plan	
<i>(millions of 1995 dollars)</i>	
HOV Expressway	\$738
· HOV Access - \$377	
· Regional Express Bus - \$361	
Commuter Rail	669
· Capital - \$539	
· O&M - \$130	
Electric Light Rail	1,801
Debt Service	171
Community Connections	255
Regional Fund/Reserves	280
Total	\$3,914
Source: RTA.	

Figure 2	
RTA Spending	
March 1995 Proposal,	
16-Year Plan	
<i>(millions of 1995 dollars)</i>	
Regional Express Bus	\$275
Commuter Rail	894
· Commuter Rail Capital - \$574	
· Commuter Rail O&M - \$320	
Electric Light Rail	4,595
· Capital - \$4,015	
· Operations - \$580	
Debt Service	190
Transit Development Fund	590
Fare Integration/Reserves	160
Total	\$6,704
Source: RTA.	

Buses

Perhaps the largest change in priorities between the new plan and the old involves buses. The RTA now proposes to fund a system of 20 regional bus routes rather than the previous eight. These buses would operate on the region's freeways (in HOV lanes where available) in a system called the HOV Expressway. Spending on bus equipment and operations would equal \$361 million over 10 years. This contrasts with 16 year spending of \$275 million under the old plan. In addition the new plan would spend \$377 million to build specialized access ramps to allow the HOV network to function more effectively.

Commuter Rail

In both the new and the old plans commuter rail would run from Everett through Seattle and Tacoma to Lakewood. Capital spending is down slightly, \$539 million vs. \$574 million. The new plan omits stations at Lenora, Spokane, and Georgetown in Seattle. Operating and maintenance expenses are reduced considerably more, \$130 million vs. \$320 million. Much of this reduction is an artifact of the shorter time span for which costs are presented. Some, however, reflects the fact that the new plan offers only rush hour service.

Light Rail

Light rail spending drops considerably in the new plan. Where the old plan allocated almost \$4.6 billion to light rail, the new plan spends \$1.8 billion. RTA wants to build two segments of the longer light rail system that voters rejected last year. These segments would run from downtown Tacoma to the Tacoma Dome and from South Sea-Tac through downtown Seattle to the University District. This would include tunneling through First and Capital Hills and under the Ship Canal. RTA rejected the option of reducing costs by running on the surface.

The light rail is explicitly called a “starter system.” As RTA describes it, “This new transportation link provides a stepping stone for expansion into the next century.”⁵ Included in the plan are moneys for preliminary engineering evaluation of extending light rail from the University District to Northgate. If RTA can obtain more than the budgeted federal funding, this segment will also be constructed.

The new plan budgets \$171 million for debt service and \$255 million for community connections. The final \$280 million goes to a regional fund (to pay for fare integration, planning for expansion, and administrative expenses) and to a reserve fund.

Financing

Figure 3 shows the revenues associated with the new proposal, while Figure 4 shows the revenues for the March 1995 proposal. The two proposals impose the same taxes, 4/10 of one percent sales tax and 3/10 of one percent MVET. Total tax revenues are lower for the new plan, because of the shorter duration of the planning period.

The new plan, despite the lower capital outlay, actually issues a greater amount of debt (measured in 1995 dollars) than did the old plan.

Figure 3

**RTA Spending
November 1996 Proposal
(millions of 1995 dollars)**

Local Taxes	\$1,980
Bonds	1,052
Federal	727
Farebox/Other	155
Total Revenue	\$3,914

Source: RTA.

Figure 4

**RTA Spending
March 1995 Proposal
(millions of 1995 dollars)**

Local Taxes	\$3,339
Bonds	800
Federal and State	2,000
Farebox/Other	565
Total Revenues	\$6,704

Source: RTA.

The new plan anticipates no funding from the state, while the old plan budgeted \$880 million. Total federal money budgeted for the new plan, \$727 million, is less than for the old plan, \$1120 million. As this funding would come over 10 years, however, rather than 16, the annual rate of funding is actually higher than with the old plan.

Finally, fares, interest and other income total \$155 million.

III. Critical Issues

Congestion

Traffic congestion occurs when more drivers attempt to use a piece of roadway than it can comfortably carry. Congestion is not just a civil engineering problem, however, to be solved by adding more physical capacity to the system. Ultimately congestion is the result of a large number of individual behavioral decisions. Employers choose where to locate factories and offices. Families decide where to establish homes. Commuters decide whether to drive alone or carpool, whether to ride a bicycle or a bus. Shoppers decide which stores to patronize and at what hour. These decisions all reflect private calculations of cost and benefit.

When congestion raises the time cost of using a particular roadway at a particular hour of the day, drivers respond. Some take other routes. Others travel at alternative hours. Still others take public transportation. If capacity is added to the roadway, utilization will increase as additional drivers converge on the roadway from other routes, other times, and other modes in response to the reduced time cost. This triple convergence prevents increases in road capacity from bringing long run improvements in congestion. Attempts to reduce congestion by adding capacity to the system in the form of public transit are similarly doomed. Most of those drivers who are drawn off of the roadways to rapid transit will be replaced by others eager to take advantage of the apparent increase in capacity.

The interaction between cars on a roadway involves what economists call an externality. On a congested road, each additional driver decreases the speed at which traffic flows, increasing the travel time of every other driver. This cost imposed on others falls outside of the cost benefit calculation of the individual driver. The essence of the congestion problem is not a lack of capacity, but rather a failure to face individual drivers with the full cost of their actions. Ultimately, economics teaches, the only real solution to the problem is to impose roadway tolls that selectively raise the costs of using the most congested pieces of roadway.

As the economist William Vickrey observes, "It has been said that if nothing stops the growth of population but misery and starvation, then the population will grow until it is miserable and starves. Similarly, if . . . nothing stops the growth of . . . traffic but congestion and delay, then such traffic will grow until sufficient congestion and delay are generated to constitute a deterrent, or until the core begins to suffer from gangrene, at which point a cumulative decline may set in that may be difficult to reverse . . ."

Simulations by the PSRC show the ineffectiveness of high capacity transit as a tool against congestion. The system proposed last year by RTA would have increased average rush hour speeds on the region's road network by at most 3/10 of a mile per hour. The only policy that the simulations show to have a large effect on congestion is congestion pricing, which yields a 4.2 m.p.h. increase in average vehicle speeds.⁶

Figure 5

1992 Regional Transportation Funding

(millions of 1992 dollars)

	Public Transit	Highways	City Streets	County Roads	Ferries
Operations	\$58,976	-	-	\$554	\$55,139
Local Sales Tax	188,055	-	-	-	-
County Road Levies	-	-	-	90,387	-
Local Vehicle License Fees	-	-	11,863	13,538	-
City general funds	-	-	114,919	-	-
Other Local Taxes and Fees	5,705	5,520	45,595	27,129	207
State Fuel Tax	-	90,614	64,452	47,136	16,215
State MVET	104,259	16,877	-	-	35,581
State Vehicle Fees	-	31,683	-	-	2,999
Other State	-	12,201	6,647	9,208	-
Federal Highway Admin.	-	171,985	27,469	24,110	-
Federal Transit Authority	16,641	-	600	-	1,075
Other Federal	-	-	-	3,166	-
Total Funding	\$373,636	\$328,880	\$271,545	\$215,228	\$111,216

Source: Porter & Associates, Inc. *Financial Elements of the Metropolitan Transportation Plan*. April 1995.

The Funding Crunch

The RTA proposal must be considered in the context of the region's many transportation needs and limited funding capacity. In May 1995 the PSRC adopted its first major Metropolitan Transportation Plan (MTP). This plan was developed over a period of one and one-half years in response to a federal mandate that states and their metropolitan regions produce detailed, long-range plans in order to be eligible for grants from the Department of Transportation. The MTP includes an inventory of the region's sources of transportation funding for the year 1992 and projections of the money that will be available from each source through 2020.

The money that state and local governments spend on transportation is raised through a variety of federal, state, and local taxes as well as through the farebox. The MTP shows transportation funding totaled \$1.3 billion dollars in the four county PSRC region in 1992. Local governments raised 39 percent of the money; the state, 34 percent. Federal grants accounted for 19 percent of the total, while the operating income of the local transit agencies and cross sound ferries contributed 18 percent.

This simple breakdown hides a very complicated structure of taxes and intergovernmental transfers of funds. Figure 5 details this structure. Of the money collected in 1992, 65 percent was dedicated to a specific mode of transportation, while a further 18 percent was tied to a specific location. Only 17 percent of the region's transportation revenues come from sources which would allow them to be flexibly reallocated across modes and the region. This system of rigid earmarking of taxes means that transportation expenditure decisions are driven by financing considerations.

Most of the local money for transit is raised through the local option sales tax. The state allows local

governments to collect a maximum of 6/10 of one percent on sales for public transit. (King County is at the maximum, as is Snohomish County outside of Everett. In Everett and in Pierce County, the sales tax for transit is 3/10 of one percent.) State funding for local transit comes from the MVET. This annual tax is 2.2 percent of assessed vehicle value. Approximately one-third of the amount collected is available to local transit agencies if matched by local taxes. Federal transit money comes from grants by the Federal Transit Administration. The state fuel tax is the largest state source of highway money. Vehicle fees comprise the second largest source. Federal money comes as grants from the Federal Highway Administration. Most state money for city streets and county roads comes from the fuel tax. The major local sources are city general funds, county road levies, and local vehicle license fees. Federal money again comes from the Federal Highway Administration.

As part of the Metropolitan Transportation Plan, the PSRC has made projections of the funds that would be available over the next 25 years under current laws. These projections show that a total of \$37.8 billion (1995\$) will be available to the region for public spending on transportation over the period. These moneys are shown in Figure 6. Almost one-half of the total, \$17.6 billion (1995\$) would come from local taxes and fees. State taxes would provide \$12.3 billion, one-third of the total. Federal taxes and operating income each would amount to about one-tenth of the total, \$4.0 billion and \$3.9 billion respectively.

Figure 6

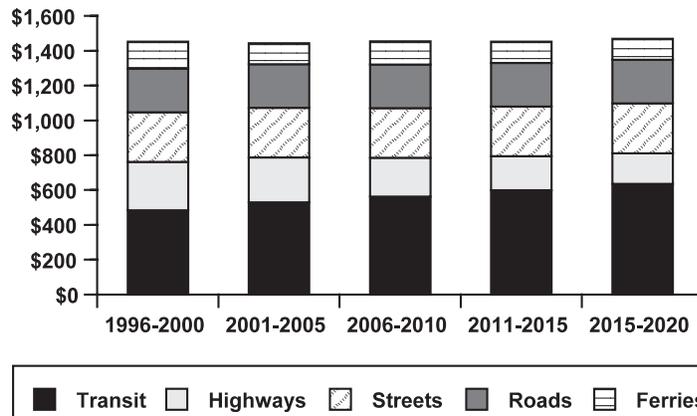
Projected Revenue by Source, 1996-2020
(billions of 1995 dollars)

Operating Income	
Transit	1.9
Ferries	2.0
Local Taxes and Fees	17.6
State Tax Distributions	12.3
Federal Tax Distributions	4.0
Total	\$37.8

Source: Porter & Associates, Inc. *Financial Elements of the Metropolitan Transportation Plan*. April 1995.

Figure 7

Projected Annual Spending with Current Funding
(millions of 1995 dollars)



Source: Porter & Associates, Inc. *Financial Elements of the Metropolitan Transportation Plan*. April 1995. WRC.

Annual revenues under current laws will change remarkably little, adjusted for inflation, over the next 25 years, averaging \$1.5 billion (1995\$) per year for the period.

The MTP outlines two spending programs for the region. The first, which spends only the revenues anticipated under existing laws, would cost \$37.8 billion (1995\$). The second, the “preferred scenario”, would cost considerably more, \$59.1 billion (1995\$).

Figure 7 shows the annual average spending at five year intervals for transit, highways, streets, roads and ferries that would be supported by the existing revenue sources. Although the aggregate annual spending is fairly stable, the period sees some significant changes in the taxes earmarked for the

specific spending areas. Revenues earmarked for transit grow over time while those earmarked for highways fall, for example. This is a consequence of the differing natures of the tax bases and tax rates that fund the various programs.

For both the sales tax and the motor vehicle excise tax, transit's two main revenue sources, the base tends to rise in lockstep with the regional economy, while the rate is specified as a percentage. Transit taxes thus tend to grow with the economy.

For highways, the primary revenue sources are the federal and state gas taxes. The fuel mileage of automobiles has increased over time, and this trend is expected to continue. The gas tax base thus tends to lag behind economic growth. Moreover, the gas tax is specified as a fixed amount per gallon rather than as a percentage of price. As a result, inflation tends to erode the real value of the tax. Together the declining base and eroding rate give a revenue stream that declines over time.

For city streets and county roads, revenues from the state gas tax should decline. The local taxes that support streets and roads, however, are fairly well indexed to growth. On balance, the money for city streets is projected to hold steady over time, while that for county roads will rise slightly.

Thus, looking forward over the next 25 years, public spending on transportation will represent a declining share of regional income under current laws. Not only that, streets, roads and highways will receive a declining share of that spending.

Questions of funding are likely to dominate public discussions of transportation planning. Because of the erosion of the gas tax, under current law the level of transportation spending will decline relative to the regional economy, and this decline will be born primarily by the roadway network. Public willingness to absorb tax increases is limited. The City of Seattle is already facing a funding shortfall for street repairs. Mayor Rice, however, is reportedly reluctant to ask voters to approve a property tax levy for streets until after the RTA vote. The thinking is that "a street levy to help fill potholes could be so popular with voters it might win—at the expense of" RTA.⁷

Taxpayer Costs

Under the RTA proposal, the sales and use taxes would increase from 7.9 percent to 8.3 percent in the portions of the Regional Transit District within Pierce County and the City of Everett, and from 8.2 percent to 8.6 percent in the rest of the district. The MVET will increase from 2.2 percent of vehicle value to 2.5 percent. The annual tax on a car valued at \$15,000 would increase \$45, from \$330 to \$375.

Figure 8 presents estimates of the annual cost of these taxes on homeownership families of four with various annual incomes. Median incomes of families in King, Pierce, and Snohomish Counties, as measured by the 1990 Census and expressed in 1997 dollars, are

Figure 8

Projected Burden of RTA Taxes by Income in 1997 for a Family of Four

Income	Sales Tax	MVET	Total
\$25,000	\$51	\$29	\$80
\$35,000	\$61	\$36	\$97
\$45,000	\$71	\$42	\$113
\$55,000	\$81	\$46	\$127
\$65,000	\$91	\$50	\$141
\$85,000	\$110	\$59	\$169
\$105,000	\$128	\$66	\$194

Source: WRC update of DOR Tax Alternatives Model.

\$58,065, \$45,754, and \$53,552, respectively. Based on these figures, the median family would pay about \$132 per year in King County, \$126 a year in Snohomish County and \$115 in Pierce County the first year that the taxes are imposed, 1997. Inflation and real income growth would increase the annual taxpayer cost in later years.

The Prospects for Federal Money

The federal funding assumptions of the new RTA proposal are more aggressive than for last year's proposal (\$72.7 million per year vs. \$70 million, in 1995\$). There are two distinct questions to ask about federal funds: First, will the RTA be able to get sufficient federal money in order to meet the 10-year construction timetable? Second, would federal grants to RTA represent a gain in transportation funding for the region, or would the grants come from federal moneys that will be allotted to the region even absent the RTA program?

Congress generally authorizes federal programs for highways and mass transit through multi-year acts. The current law is the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), which runs through September 30, 1997. ISTEA authorizes \$151 billion in spending over six years.

The federal government funds state and local transportation projects through two types of programs. *Formula* programs allocate money to states and localities on the basis of legislated formulas. *Discretionary* programs make state and local governments compete with one another for a limited number of grants from the Department of Transportation. In some cases, the competition is short-circuited when congress *earmarks* the discretionary funding to specific local projects.

ISTEA shifted spending from discretionary programs, in the belief that grant chasing encourages inefficient transportation investments. Similarly, to promote efficiency, ISTEA gave state and local officials more latitude to transfer funds between formula programs.

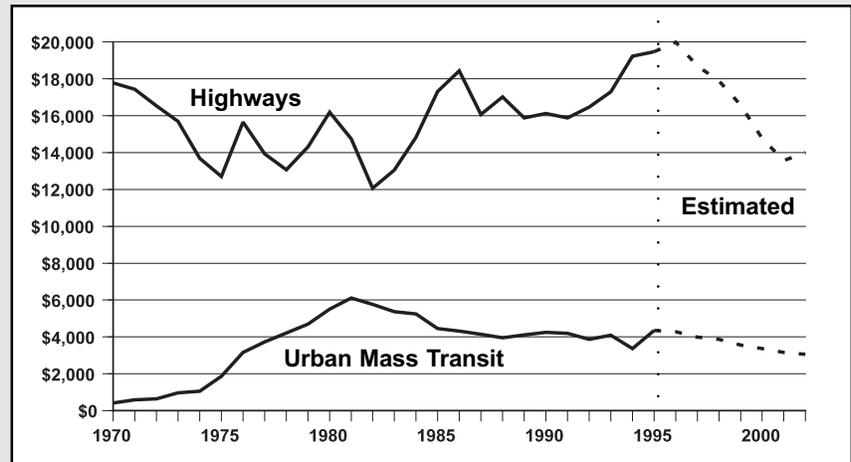
ISTEA required that each metropolitan area with a population 50,000 or more create a Metropolitan Planning Organization (MPO), and guaranteed MPOs with 200,000 residents direct funding under the Surface Transportation Program. The PSRC is the MPO for the Seattle area. The recently completed Metropolitan Transportation Plan responds to the planning requirements of ISTEA.

In contrast to ISTEA's general theme of pushing decision making down to the states, the bill included a record number of earmarks. In general these earmarks are viewed as pork, and they have been tempting targets for budget cutters. Notably, this pork includes the mass transit projects funded under the Federal Transit Administration's New Starts program. (The RTA project was allocated \$325 million in New Starts money; it is uncertain whether this money will carry over when ISTEA expires in 1997.)

Looking to the future, it seems likely that an even greater share of federal transportation funding will take the form of flexible formula grants. President Clinton's Fiscal 1996 Budget proposed a major restructuring of the Department of Transportation. Most programs would be consolidated into a new Unified Transportation Allocation Grant, a formula grant. Congress has not yet chosen to act on this proposal. In 1997, however, ISTEA will expire, and Congress will be forced to write a new transportation bill. The Clinton proposal is consistent with Congressional Republicans' general desire to devolve decision making to the state and local governments, and is unlikely to be affected by a change in administration.

In any event, the prospects are for a drop in the level of federal transportation grants. Figure 9 shows projections from President Clinton's 1997 Budget of federal grants-in-aid for highways and urban mass transit. Adjusted for inflation, highway grants in 2002 are expected to be 18 percent below the 1996 level, while mass transit grants are expected to fall by 17 percent. For this reason it is hard to be optimistic that the RTA will be able to get much new federal money to fund its plan. The prospects are somewhat brighter for diverting federal formula grants to the project. There are substantial overlaps between the boards of the RTA and the PSRC. As an MPO, the PSRC allocates about \$90 million federal transportation dollars each year. Some of this money could be directed to RTA. The state could also direct federal funds under its control to RTA.

Figure 9
Federal Grants-in-Aid
(millions of 1995 dollars)



Source: OMB. Budget of the U.S. Government, Fiscal Year 1997.

Transit Technologies

The RTA proposal uses three distinct transit technologies: commuter rail, light rail and bus.

Commuter rail generally denotes suburban—city center rush hour passenger train service offered on tracks that also carry freight. On the east coast, public commuter rail is often descended from service begun in the 19th century by private, intercity railroads. Commuter rail is frequently electrically powered, although RTA's trains would be diesel. Because the rails are already in place, commuter rail can be rapidly implemented. To the extent that the freight rights-of-way are underutilized, the capital outlay required for commuter rail would seem to be fairly low.

Modern light rail has evolved from the old streetcar. Light rail trains run on tracks built exclusively for transit, drawing power from overhead wires. There is a tremendous variation in the cost and performance of modern light rail systems. At one extreme is surface light rail transit (LRT) which runs on streets and highways, predominantly in exclusive lanes. Sharing streets with pedestrians and automobiles compromises performance. Peak speeds are limited and, in addition, the need to minimize interference with cross traffic limits both the length and frequency of trains. Portland, Oregon's MAX is an example of LRT.

At the other extreme is light rail rapid transit (LRRT). LRRT is fully separated from pedestrians and automobiles: Trains run through tunnels, on elevated tracks, or within freeway rights-of-way. As a result,

speeds are higher than for LRT and the potential capacity of the system is significantly greater. The performance of LRRT is comparable to that of heavy rail systems such as San Francisco's BART. (With heavy rail, electric power is drawn from a third rail below the train rather than from a wire above.)

The RTA's light rail would be a hybrid. Trains would run through tunnels from the University District through downtown Seattle, but on the surface in the suburbs and in Tacoma.

The bus is the nation's most prevalent mode of public transit. Its value is often underrated in comparison to the glitzier rail technologies.

In the 1960s, John R. Meyer, John F. Kain and Martin Wohl authored a highly regarded study of urban transportation which compared the cost effectiveness of public transit modes.⁸ Subsequent research has reaffirmed their findings. Meyer, Kain and Wohl concluded that in most cases buses provided a less expensive means than trains for line-haul mass transit. Essentially the cost advantage of buses come from their ability to share rights-of-way with automobiles and trucks. Only at very high volumes do the lower operating costs of trains overcome the higher capital cost.

In recent years Kain has been a highly vocal critic of the decisions to build new rail systems in various metropolitan areas. Kain argues that, with the urban densities typical in America, a well crafted bus system will provide superior rapid transit than a mixture of trains and buses.

Bus rapid transit has several inherent technological advantages over heavy rail and LRT systems that should enable it to perform better than these modes in most situations, . . . The small unit size of buses, frequently cited as a disadvantage by advocates of rail transit, is actually an advantage in most situations, since it permits more frequent and/or more direct service and lower trip times.

The longer trip times of light and heavy rail systems are attributable to the fact that trains cannot pass one another, even where patterns of demand and trip volumes would permit. As peak hour volumes decline and routes become longer, the performance advantages of express bus operations increase.

The much lower costs per passenger trip and high performance of the so-called "Freeway Flier" alternative are explained by the fact that these systems can be closely tailored to demand and because the heavy capital costs of the high performance roads they use may be shared with other users. Where express buses are able to share the huge costs of high performance right-of-ways with other users, the costs of bus rapid transit become a fraction of those of light or heavy rail or bus rapid transit on exclusive right-of-ways.⁹

The effectiveness of buses as high capacity transit is enhanced when the interference from other traffic is minimized. One way to limit interference is to build exclusive roadways for buses—busways. The cost of exclusive busways, however, can approach the cost of rail right-of-way. At this region's levels of transit use, much of an exclusive busway's capacity would go unutilized. To avoid this waste, other high occupancy vehicles share the special roadways provided for transit. This, in effect, lowers the cost of providing congestion free lanes for buses.

The Washington State Department of Transportation (WSDOT) has identified a 276 mile core system of freeway HOV lanes within the PSRC region. The recently adopted PSRC Metropolitan Transportation Plan gives high priority to completing the system. At the present time, however, a number of segments remain unfunded. In addition, WSDOT's Office of Urban Mobility has recommended additional segments to be included in the core HOV system. All together over \$1.6 billion in funding is needed.

When HOV lanes are on the left-side (or inside), entering or exiting vehicles are forced to weave across traffic. The effectiveness of the HOV network would be enhanced by on- and off-ramps providing direct access to the HOV lanes and by direct connections between the HOV lanes at intersecting freeways. The Office of Urban Mobility has recommended an \$853 million package of direct ramps and connections for the HOV network.

Currently on much of I-405 HOVs run in the rightmost lane, allowing easy entrance and exit from off of the freeway. This is particularly valuable for local buses which use the system, but creates a situation where SOVs must cross the HOV lane when entering and exiting the freeway. As traffic increases, this interference from SOVs seriously decreases HOV speeds. Moving the HOV lane to the far left would eliminate this problem, but this would make the network much less effective for local transit unless ramps are provided.

The new RTA proposal includes \$377 for HOV connections. The March draft had included money for HOV lanes, but this was cut from the final proposal.

The Accuracy of RTA's Cost Estimates

The cost estimates offered for urban rail transit systems have been notoriously bad. For example, Don H. Pickrell studied the cost estimates for light rail projects in Buffalo, Pittsburgh, Portland and Sacramento.¹⁰ After removing the effects of general inflation, Pickrell found that capital costs averaged 27 percent above forecast, while operating expense averaged 16 percent above forecast. (The experience for heavy rail has been even worse.) In light of this experience, the Legislature created an Expert Review Panel to watch over the RTA's cost estimates. As a result RTA's forecasts may be more accurate than those reviewed by Pickrell. ECONorthwest, however, expressed the opinion that the RTA's estimates "appear low."¹¹

The relative risk in costs is certainly greater for this new proposal than for last year's, since tunneling now represents a greater share of the cost. Cost estimates for work underground are simply more uncertain than for above ground work. As one expert quipped when discussing the last proposal, "Murphy lives underground."

It is worth noting that RTA's published cost estimates are in 1995 dollars. Translating to current, 1996, dollars would most likely result in higher costs. Inflation from 1995 to 1996 is estimated by DRI/McGraw-Hill at 2.5 percent measured by the GDP Chain-Weighted Price Index and 3.0 percent measured by the consumer price index. Adjusting by the GDP price index would push the cost in 1996 dollars over \$4 billion.

System Performance

RTA estimates that during the p.m. rush, commuter rail will take 67 minutes to get from King Street in Seattle to Everett (the average speed would be 31 m.p.h.). The reverse commute, from Everett to Seattle, would take only 60 minutes. The p.m. trip from the Tacoma Dome to King Street would take 58 minutes, at an average speed of 41 m.p.h.

RTA will run light rail over two segments, downtown Tacoma—Tacoma Dome and University District—South Sea-Tac. The trip from the Tacoma Dome to downtown Tacoma would take 6 minutes. Figure 10 shows estimated travel times between stations along the Seattle segment.¹²

Figure 10
Estimated Light Rail Travel Times in Minutes

	S. 200th	Sea-Tac	S. 158th St.	144th St.	Boeing Access Road	Henderson	Othello	Columbia City	McClellan	Rainier	International District	Convention Center	First Hill	Capital Hill	Campus Parkway
45th	52.5	48.5	44.5	42.0	36.0	32.5	29.0	25.0	21.0	19.0	14.5	9.5	8.5	7.5	2.0
Campus Parkway	50.5	46.5	42.5	40.0	34.0	30.5	27.0	23.0	19.0	17.0	12.5	7.5	6.5	5.5	
Capital Hill	45.0	41.0	37.0	34.5	28.5	25.0	21.5	17.5	13.5	11.5	7.0	2.0	1.0		
First Hill	44.0	40.0	36.0	33.5	27.5	24.0	20.5	16.5	12.5	10.5	6.0	1.0			
Convention Center	43.0	39.0	35.0	32.5	26.5	23.0	19.5	15.5	11.5	9.5	5.0				
International District	38.0	34.0	30.0	27.5	21.5	18.0	14.5	10.5	6.5	4.5					
Rainier	33.5	29.5	25.5	23.0	17.0	13.5	10.0	6.0	2.0						
McClellan	31.5	27.5	23.5	21.0	15.0	11.5	8.0	4.0							
Columbia City	27.5	23.5	19.5	17.0	11.0	7.5	4.0								
Othello	23.5	19.5	15.5	13.0	7.0	3.5									
Henderson	20.0	16.0	12.0	9.5	3.5										
Boeing Access Road	16.5	12.5	8.5	6.0											
S. 144th	10.5	6.5	2.5												
S. 158th	8.0	4.0													
Sea-Tac	4.0														

Source: RTA. WRC.

People are often surprised to find that travel times by rail are as long as those shown. The average speed from the University District to South Sea-Tac would be only 27 miles per hour. This low average speed is explained by the need for trains to stop at stations.

Interestingly, the travel time by light rail between the Convention Place station in downtown Seattle and Sea-Tac is 39 minutes. Metro currently offers twice hourly buses connecting Convention Place with the airport with a 34 minute travel time.

IV. Questions to be Considered

Before reaching a decision whether to support the RTA proposal voters should try to answer a number of questions:

Does the proposed “starter” investment in light rail make sense as a stand alone system?

If not, what future investments will be necessary to achieve a sensible system?

Is RTA likely to get the federal funding that it is counting on?

Is the projected debt level prudent?

Can the project be completed at the projected cost?

What will RTA do if costs prove to be higher than it has estimated, or federal funding lower?

Will the PSRC direct the federal funds under its control to RTA?

Will increasing taxes to pay for RTA make voters less likely to support other tax increases to fund transportation investments?

If so, what specifically will be foregone?

In the long-run will commuter rail interfere with freight traffic?

Does the governance structure of RTA, with a board not directly chosen by voters, give sufficient assurance that the RTA will be accountable for its actions?

As the campaign progresses, the Washington Research Council will offer periodic updated analyses of RTA in the form of Policy Briefs.

Endnotes

¹ The JRPC estimated this cost as \$7.5 billion (1991\$). We translate to 1995\$ using the GDP chain-type price index.

² Central Puget Sound Regional Transit Authority, "RTA Meeting Report of May 31, 1996," *On Board*, v. 4, n. 6,

³ "Minority Report of Emory Bundy," May 20, 1996.

⁴ Letter of Daniel Malarkey to Emory Bundy, dated May, 2 1996. Appended to "Minority Report of Emory Bundy."

⁵ RTA, "The Ten-Year Regional Transit System Plan, Draft," March 29, 1996.

⁶ See Washington Research Council, "RTA impact on congestion," Policy Brief 95:5, Feb. 1, 1995.

⁷ Peter Lewis, "Rice opposes fall vote on street repair," *The Seattle Times*, June 28, 1996.

⁸ John R. Meyer, John F. Kain, and Martin Wohl, *The Urban Transportation Problem*, Cambridge, MA: Harvard University Press, 1965.

⁹ John F. Kain, "Choosing the Wrong Technology: Or How to Spend Billions and Reduce Transit Use," *Journal of Advanced Transportation*, Vol. 21, Winter 1988, p 206.

¹⁰ Transportation Systems Center, "Urban Rail Transit Projects: Forecast versus Actual Ridership and Costs," Cambridge, MA, U. S. Department of Transportation, October 1989 (PB90-148693).

¹¹ Daniel Malarkey letter to Emory Bundy.

¹² These travel times have been compiled from station to station run times calculated for RTA by LTK Engineering Services. Times are rounded down to whole minutes. The LTK calculations did not include a First Hill station. We assume stopping at First Hill adds 1 minute.

Washington Research Council

1301 5th Avenue, Suite 2810
Seattle, WA 98101-2603
(206) 467-7088 or 1-800-294-7088
FAX (206) 467-6957

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