Vanpools in the Puget Sound Region
The case for expanding vanpool programs to move the most people for the least cost
Part III: Analysis of Vanpool Performance and Market Potential

by Michael Ennis
Director, WPC’s Center for Transportation

October 2009
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This is the third report in a four-part series on vanpools in the Puget Sound region. You can find this report and the full series online at washingtonpolicy.org.

Part I: The Vanpool Solution, A faster, cheaper and easier way to commute (video)
Part II: Introduction & Background
Part III: Analysis of vanpool performance and market potential
Part IV: Recommendations

Executive Summary

As traffic congestion and the financial and environmental costs of commuting continue to rise, a once overlooked transit alternative has quietly become an effective option for many motorists: vanpools.

Sharing a commute through a vanpool:

- Reduces parking and fuel costs
- Allows access to HOV lanes
- Consumes fewer resources
- Is cheaper, more flexible and faster than other mass transit choices

Regional growth projections and travel patterns show there is a large undeveloped market in vanpool demand. Yet, expanding vanpools is typically not a priority for state and local government’s as other, more inefficient transit modes are marketed and funded. Vanpools are not for everyone and they cannot effectively serve short, intra-city transit demand. Ridership figures, costs and market potential in the Puget Sound region however, show that vanpools are a successful and more efficient way to move long-distance, inter-city commuters.

Instead of spending more public money to connect cities with high speed rail, commuter rail, light rail and express bus services, policymakers should look to vanpools as the most efficient alternative.
Part III: Analysis of Vanpool Performance and Market Potential

Suburbs give rise to inter-city transit systems

As the suburbanization of communities in the Puget Sound region developed over the last three decades, many transit agencies recognized the importance of connecting these outlying areas to employment centers with inter-city transit systems. In the 1990s, this regional approach gave rise to Sound Transit and its line of express buses, commuter rail and light rail to connect users in King, Pierce and Snohomish Counties. This growth pattern also contributed to new funding policies like King County’s 40/40/20 rule – which distributes 40 percent of any new transit service to the Eastside, 40 percent to South King County and only 20 percent to Seattle – to reach the suburbs.

As inter-city transit, these fixed-route systems are very expensive and do not attract a lot of riders to justify the costs. For example, Sound Transit estimates that its entire system will carry about 358,000 trips per day by 2030.¹ The Puget Sound Regional Council (PSRC) estimates that motorists and transit users will make about 15 million total trips per day in King, Pierce and Snohomish Counties by 2030.² This means Sound Transit is spending more than thirty years and nearly $40 billion to build a system that will only carry about 2.4 percent of all daily trips.

In the mean time, traffic congestion in the Seattle region is predicted to double and reach the levels of present day Los Angeles over the same time period.³ There is a more efficient and effective transport method to connect these suburban neighborhoods with transit: vanpools. Vanpools are far more flexible, faster and require less public tax support than other, fixed route mass transit modes, like buses or rail.

In Washington, there are twenty vanpool programs, six within the Puget Sound region. In terms of the number of vans in service and passenger trips, King County manages the largest public vanpool program in the state and the nation.⁴ In 2007, King County operated 826 vanpools and carried 2.3 million passenger trips.⁵ Only Chicago and Houston come close to running systems as large. In 2007, Chicago operated 677 vans and served 1.9 million trips while Houston managed 545 vanpools and carried about 2.0 million trips.⁶

Modal Performance

Vanpools have several competitive advantages that allow them to achieve better performance over other types of inter-city transit modes like buses and rail. In each case, vanpools are cheaper and more flexible.

Comparing the performance of vanpools with other transit modes, however, is difficult. Vanpool passengers are generally commuters traveling between home and work. This means vanpools have a much narrower market and cannot always be accurately compared to broad, intra-city bus programs like those found in

⁵ Ibid.
⁶ Ibid.
Tacoma and Seattle. While these programs provide some regional inter-city routes, their overall system is mostly comprised of shorter, inner city trips that make comparison to a commute-oriented regional program like vanpools somewhat unreliable.

The Puget Sound region does have a large inter-city transit program that makes a more dependable comparison to vanpools possible. Sound Transit provides express bus, light rail and commuter rail service between cities in Pierce, King and Snohomish Counties. While Sound Transit does provide service to special events and some weekend users, it caters mostly to suburban commuters traveling to large employment centers in Tacoma, Seattle and Bellevue. This type of inter-city transport allows more accurate modal comparisons to vanpools.

While this study does measure the performance of broader bus programs like King County Metro and Pierce Transit, more emphasis should be placed on Sound Transit’s inter-city system for the reasons already stated. Because light rail is also considered an inter-city mode and is a growing part of the regional transit network, a comparison to vanpooling is appropriate. However, Sound Transit’s light rail line has not been open long enough to provide sufficient data. In order to account for light rail, this study uses the performance data from three West Coast systems: San Jose, Portland and Los Angeles. The data from these three agencies may or may not accurately represent the experiences of Sound Transit’s system, but it provides a general sense of how light rail compares with other transit modes.

There are generally two modal characteristics that illustrate the cost effectiveness of public transit: expenditures per passenger trip and expenditures per passenger mile. Both measure the relationship between the costs of providing a service with its particular level of demand. This allows for a fair comparison between modes and between large and small programs.

The following table compares the expenditures per passenger trip of vanpools in the Puget Sound region with other transit modes.  

<table>
<thead>
<tr>
<th>Expenditure per Passenger Trip</th>
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<tbody>
<tr>
<td></td>
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<tr>
<td><strong>Six Regional Vanpool Agencies</strong></td>
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<tr>
<td>------------------------------</td>
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<td><strong>Six Regional Bus Agencies</strong></td>
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<tr>
<td><strong>Sound Transit Buses</strong></td>
</tr>
<tr>
<td><strong>Sound Transit Bus</strong></td>
</tr>
</tbody>
</table>

*Source: National Transit Database*

*Data totaled from light rail systems in San Jose, Los Angeles, and Portland*

**Excludes data for purchased transportation**

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7 Vanpool data is comprised from the six regional agencies that provide vanpool service. They include Island Transit, King County Metro, Pierce Transit, Kitsap Transit, Community Transit and Intercity Transit. The regional bus data is comprised from the same six public agencies. Light Rail performance is produced from combining three West Coast systems: Los Angeles, Portland and San Jose. Portland was chosen because it is generally regarded as the most efficient light rail system in the country. San Jose was chosen because it is generally regarded as the least efficient light rail system in the country. Los Angeles is included to help balance out the average. Sound Transit bus data was comprised from buses operated by Sound Transit only; service purchased from King County Metro is not included. Sounder Commuter Rail performance is measured as reported to the National Transit Database from Sound Transit.
The six regional vanpool agencies provided almost 32 million passenger trips between 2000-2007, for about $114 million in operating costs and nearly $50 million in capital expenditures. Vanpools experienced operating costs of $3.58 per passenger trip and a total cost of $5.14 per passenger trip when capital expenses are included.

The two most relevant transit modes to measure against vanpools are Sound Transit’s Express bus system and the Sounder Commuter Rail, both of which are considered commuter-based, inter-city programs. Between 2000 and 2007, the Sounder Commuter Rail served only 8.2 million passenger trips for $124 million in operating expenses and nearly $1 billion in capital costs. In other words, it takes $15.05 in operating expenses for the Sounder to carry one passenger trip and $136 per passenger trip when capital expenditures are included. This means vanpools served four times more passengers for 1/7th the cost of Sound Transit’s Sounder Commuter Rail.

King County’s vanpool program alone carries more people than Sound Transit’s entire commuter rail, for $1 billion less.

Sound Transit’s Express bus program is also less effective than vanpools. During the seven years between 2000 and 2007, the agency spent nearly $900 million to carry 44.5 million trips for a total cost of $18.03 per passenger trip. This means vanpools are 2½ times more efficient than Sound Transit’s Express bus program.

Comparing capital expenditures among different transit modes is sometimes unreliable. For example, Sound Transit’s commuter rail and bus systems have high capital-per-trip costs because they include the startup expenses of buying trains, track easements, buses and other supporting infrastructure. Over time, these capital costs should fall as the systems reach capacity. The opposite can also be seen with the light rail systems in San Jose, Los Angeles and Portland. These programs are established and have been operating for many years. Light rail is generally regarded as one of the most expensive public transportation modes to build because of its heavy capital investments. Yet, the capital costs per trip are relatively low in this report because those startup expenses were paid before the time period used here.

What is valuable to point out however, is that vanpools require far less capital investment. Vanpool programs only require vans and perhaps storage and maintenance facilities, while other modes need expensive stations, park-n-ride lots, bus stops, locomotives and fixed guideways. Between 2000 and 2007, the six vanpool agencies in the Puget Sound area spent $50 million in capital infrastructure. This is 18 times less than the same six bus agencies, 12 times less than Sound Transit’s Express bus system and 20 times less than the Sounder Commuter Rail.

Critics say vanpools appear much cheaper than rail modes because such comparisons do not include the cost of conveyance (roads). Yet, excluding...
conveyance costs is precisely one of the reasons vanpools are much more efficient than rail transit. Roads are fixed public assets and exist with or without vanpools. In other words, roads are built for many other purposes rather than an exclusive need to provide vanpool services. Expanding the vanpool fleet in the Puget Sound region would not require building more roads, so the marginal cost of adding service only requires the additional vans and perhaps normal operations and maintenance expenses. To look at it another way, ending vanpools would not save taxpayers any money on road costs.

On the other hand, light rail and commuter rail operate on tracks that are built exclusively for that particular service to exist. If Sound Transit officials want to extend commuter rail to Bellevue they have to build tracks and those conveyance costs are appropriate to include in any comparison. In the case of the Sounder, Sound Transit is unique because it did not have to lay tracks to provide commuter rail service. The agency instead purchased an easement on existing Burlington Northern Santa Fe tracks. These conveyance costs are included in the comparison to vanpools because they are required to provide the rail service.

Looking at the expenditures per passenger mile is even more revealing by accounting for trip distances among the different modes. The following table compares expenditures per passenger mile between the years 2000 and 2007.

<table>
<thead>
<tr>
<th></th>
<th>Six Regional Vanpool Agencies</th>
<th>Six Regional Bus Agencies</th>
<th>Light Rail*</th>
<th>Sound Transit Buses**</th>
<th>Sounder Commuter Rail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Cost per Passenger Mile</td>
<td>$0.14</td>
<td>$0.67</td>
<td>$0.85</td>
<td>$0.69</td>
<td>$0.60</td>
</tr>
<tr>
<td>Capital Cost per Passenger Mile</td>
<td>$0.06</td>
<td>$0.17</td>
<td>$0.45</td>
<td>$0.43</td>
<td>$0.17</td>
</tr>
<tr>
<td>Total Expenditure per Passenger Mile</td>
<td>$0.20</td>
<td>$0.85</td>
<td>$1.15</td>
<td>$1.27</td>
<td>$0.60</td>
</tr>
</tbody>
</table>

Source: National Transit Database and Island Transit officials
* Data totaled from light rail systems in San Jose, Los Angeles & Portland
** Excludes data for purchased transportation

Vanpools are very inexpensive to operate. Between 2000 and 2007, the six regional vanpool agencies spent $114 million to provide 837 million passenger miles.13 This means operating costs were only .14 cents per mile. When accounting for ridership and distance traveled, vanpools cost between three and five times less to operate than light rail, buses or commuter rail.

The total expenditures per passenger mile during the same time period were only .20 cents for the six vanpool agencies in the Puget Sound region.14 This is six times less than light rail, eight times less than Sound Transit’s Express Bus system and 27 times less than the Sounder Commuter Rail.

Vanpools do not serve short, intra-city transit needs well and cannot replace broad-based bus systems, but in terms of moving commuters between cities, vanpools are by far the most cost effective.

Another performance measure that reflects the social benefits of vanpools is farebox recovery ratios, or the relationship between how much of operating

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13 Ibid.
14 Ibid.
expenses users and taxpayers cover. Traditional bus systems generally recover about 20 percent of their operating costs from riders, while taxpayers pay the remaining 80 percent. The following chart compares farebox recovery rates of vanpools with other transit modes.

Between 2002 and 2007, the six vanpool programs in the Puget Sound region recovered $59.2 million in passenger fares and spent about $89.7 million in operating costs. The total farebox recovery rate was about 66 percent of operating expenses, while taxpayers paid the remaining 34 percent. In 2007 the largest vanpool program, King County, had the highest farebox recovery rate, collecting 83 percent of operating expenses from passengers.

This is in stark contrast to what users pay to ride buses, commuter rail and light rail. Farebox recovery rates for these transit modes range between 19 and 26 percent of operating costs, while taxpayers pay the remaining 74 to 81 percent.

To look at it another way, the public must cover its share of operating expenses with a subsidy, generally through increases in local sales taxes. This subsidy can vary based on the efficiency of a particular transit mode and by the farebox recovery policy implemented by the legislative body of each agency. The following table compares the operating costs per boarding, operating revenues per boarding and the public subsidy required per boarding for vanpools with other transit modes between 2002 and 2007.

<table>
<thead>
<tr>
<th></th>
<th>Six Regional Vanpool Agencies</th>
<th>Six Regional Bus Agencies</th>
<th>Light Rail*</th>
<th>Sound Transit Buses**</th>
<th>Sounder Commuter Rail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating cost per boarding</td>
<td>$3.71</td>
<td>$4.36</td>
<td>$2.99</td>
<td>$6.56</td>
<td>$14.34</td>
</tr>
<tr>
<td>Operating revenue per boarding</td>
<td>$2.45</td>
<td>$0.82</td>
<td>$0.67</td>
<td>$1.43</td>
<td>$3.68</td>
</tr>
<tr>
<td>Public subsidy required per boarding</td>
<td>$1.26</td>
<td>$3.54</td>
<td>$2.32</td>
<td>$5.13</td>
<td>$10.66</td>
</tr>
</tbody>
</table>

Source: National Transit Database and Island Transit officials
* Data totaled from light rail systems in San Jose, Los Angeles & Portland
** Excludes data for purchased transportation

15 Ibid.
16 Ibid.
17 Ibid.
18 Ibid.
Between 2002 and 2007, the public paid about $1.26 for every vanpool trip made in the Puget Sound region.\textsuperscript{19} In comparison, the public paid $5.13 in operating costs for every passenger trip on Sound Transit buses and $10.66 in operating costs for every passenger trip made on the Sounder Commuter rail.\textsuperscript{20}

Regional vanpools are not only more cost effective than other inter-city transit modes, they require much less public tax support, because users cover two thirds of operational expenses. In fact, passenger fares would only need to rise $1.26 per trip, or about 50 percent, to make vanpools self sufficient. On the other hand, Sound Transit’s bus fares would need to rise an average of $5.13 per trip, or 259 percent to break even. Sounder Commuter rail would have to raise fares $10.66, or almost 200 percent to break even.

**The Market Potential for Vanpools is Large and Undeveloped**

Despite decades of restrictive government land-use policies to increase density in urban centers, residents continue a steady movement into the suburbs. Driven by a variety of social and economic factors, these growth patterns have made travel between home and work longer and more congested as average trip length and travel time have risen.

Nationally, the average commute trip has steadily grown from 8.54 miles in 1983 to 12.11 miles in 2001.\textsuperscript{21} Likewise, average travel time for commuters has also increased from 18.2 minutes in 1983 to 23.32 minutes to 2001.\textsuperscript{22}

Regional data suggest the same commute patterns exist here. The following table from the Puget Sound Regional Council shows the mean distance to work between 1999 and 2006 in the Puget Sound region.

<table>
<thead>
<tr>
<th>Sub area</th>
<th>1999</th>
<th>2006</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region</td>
<td>12.2</td>
<td>12.8</td>
<td>5%</td>
</tr>
<tr>
<td>NW/Central Snohomish</td>
<td>15</td>
<td>16.7</td>
<td>11%</td>
</tr>
<tr>
<td>SW Snohomish</td>
<td>13.4</td>
<td>13.1</td>
<td>-2%</td>
</tr>
<tr>
<td>Seattle-Shoreline</td>
<td>8.2</td>
<td>8.4</td>
<td>2%</td>
</tr>
<tr>
<td>East King</td>
<td>10.9</td>
<td>10.9</td>
<td>0%</td>
</tr>
<tr>
<td>South King</td>
<td>12.4</td>
<td>12.7</td>
<td>2%</td>
</tr>
<tr>
<td>Tacoma/SW Pierce</td>
<td>10.8</td>
<td>12.3</td>
<td>13%</td>
</tr>
<tr>
<td>Central Pierce</td>
<td>15.1</td>
<td>15.1</td>
<td>0%</td>
</tr>
<tr>
<td>East Rural</td>
<td>22</td>
<td>24.9</td>
<td>13%</td>
</tr>
<tr>
<td>North/Central Kitsap</td>
<td>11.7</td>
<td>12</td>
<td>3%</td>
</tr>
<tr>
<td>South Kitsap/Peninsula</td>
<td>18.8</td>
<td>19.9</td>
<td>6%</td>
</tr>
</tbody>
</table>

*Source: Puget Sound Regional Council*

The average distance to work rose in most every area around Puget Sound. Overall, commuters travelled an average of 12.2 miles to work in 1999 and 12.8 miles in 2006.\textsuperscript{23} This is an increase of five percent in seven years. The largest increases took place in NW/Central Snohomish County (11 percent), Tacoma and

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\textsuperscript{19} Ibid.
\textsuperscript{20} Ibid.
\textsuperscript{22} Ibid.
SW Pierce County (13 percent), and rural East King County (13 percent).²⁴

The number of commuters working in a county different from the one they live in is also growing. The following table illustrates how many commuters travel across county lines during their journey to work.

<table>
<thead>
<tr>
<th>County-Level Journey to Work</th>
<th>1980</th>
<th>1990</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workers Living in the Region</td>
<td>1,038,945</td>
<td>1,396,618</td>
<td>1,642,700</td>
</tr>
<tr>
<td>Location of Work:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In County of Residence</td>
<td>80.2%</td>
<td>80.3%</td>
<td>82.1%</td>
</tr>
<tr>
<td>In Another County</td>
<td>10.4%</td>
<td>14.4%</td>
<td>16.1%</td>
</tr>
</tbody>
</table>

Source: Puget Sound Regional Council

In 1980, 10.4 percent of commuters crossed county lines while travelling to work.²⁵ By 2000, 16.1 percent of commuters worked in a different county than the one they lived in.²⁶

Since 1980, residents around the Puget Sound region have steadily increased their travel distance and time to work. As commuters move farther away from employment centers, transportation costs grow and demand for inter-city rideshare programs, like vanpools, becomes more attractive. If these historical growth patterns continue, the market demand for vanpools will expand.

In 2003, the Washington State Department of Transportation (WSDOT) completed an analysis on the market potential of vanpool demand in the Puget Sound region. WSDOT officials joined with more than two dozen regional planning organizations, public agencies, consultants and businesses to create the Vanpool Market Action Plan (VMAP). The study reported “the existence of a very large undeveloped market for vanpooling among long-distance commuters who commute by car.”²⁷

The VMAP team found that in 2003, there was enough “…vanpool interest today (among commuters with compatible origins, destinations and schedules) to allow a near doubling of current vanpool counts to approximately 2,500 vanpools.”²⁸ Taking existing market potential a step further, the VMAP found that implementing various marketing strategies could substantially increase the historical growth rate of existing vanpool demand.

The six vanpool agencies in the Puget Sound focus most of their marketing on worksites under the state’s Commute Trip Reduction (CTR) program. Washington’s CTR program is a set of laws that require local governments and employers with 100 or more employees within the state’s nine most populated counties to participate. Those under the CTR program must develop a commute trip reduction plan that encourages employees to reduce drive-alone trips. Ridesharing and vanpools are major components of the CTR program so public agencies tend to limit marketing to these sites.

Expanding an aggressive marketing campaign beyond traditional CTR worksites, the VMAP found the region could increase vanpool use up to 11,870

²⁴ Ibid.
²⁶ Ibid.
²⁸ Ibid.
vans by 2030.29 Remarkably, this is nearly a 600 percent increase over what currently exists today.

With a combination of marketing strategies and operational enhancements, the VMAP study estimated the cost to implement its recommendations would total about $13 million.31 In the five years between 2002 and 2007, the total operating and capital costs of the six Puget Sound vanpool agencies was $164 million, or about $32.8 million per year.32 A more detailed cost analysis should be conducted, but implementing the VMAP recommendations and extrapolating this data to increase vanpools by 600 percent by 2030 shows a rough estimate to be about $4.5 billion. Moreover, vanpool users would cover about 66 percent of operating costs, reducing the total cost to the public to about $2.5 billion.

The average passenger load for a vanpool is 8.14 riders per van.33 This means if VMAP officials are correct, vanpools in the Puget Sound region could carry about 193,000 trips per day by 2030, for a public cost of about $2.5 billion.

To put this in perspective, consider that Sound Transit estimates its $22.8 billion light rail expansion will carry only 163,000 daily trips by 2030.35 So vanpools in the Puget Sound region have the potential to serve 20 percent more riders for $20 billion less than Sound Transit’s light rail expansion plan.

Conclusion

Despite growing traffic congestion and rising costs, most commuters prefer the mobility and freedom of driving a passenger car to and from work. Traditional public transit is most effective in dense, urban centers, but quickly it loses efficiency and ridership when expanded to reach long distance, inter-city riders. Vanpools are much more effective at connecting these commuters with urban employment centers. Research shows increasing public awareness would lead to significantly

29 Ibid.
31 Ibid.
32 “TS2 - Operating Expenses, Service Supplied and Consumed, TS2.1 - Service Data and Operating Expenses Time-Series by Mode,” National Transit Database, 2007, at www.ntdprogram.gov/ntdprogram/data.htm. Island Transit does not report to the NTD, so Island Transit data was obtained from Island Transit officials. Some NTD data for Sound Transit was incomplete so where appropriate, data from the American Public Transportation Association was used.
34 (8.14 passengers) * (11870 vans) * (2 trips per day) = 193,244 trips
higher ridership. In the final report of this series on Vanpools in the Puget Sound Region, Washington Policy Center will offer a set of recommendations to expand vanpool programs to move the most people for the least cost.

About the Author

Michael Ennis is the Director of the Center for Transportation at Washington Policy Center. He is the author of numerous studies on transportation policy issues, including WPC’s Five Principles of Responsible Transportation Policy. Before joining WPC, Michael worked for the Washington state Senate and House of Representatives and was formerly a staff assistant for U.S. Senator Slade Gorton. Michael served in the U.S. Army with the 2nd Ranger Battalion and has been active in local government affairs. He earned his Bachelor’s degree from the University of Washington where he studied Political Science. He also earned his Master’s of Public Administration degree from the Daniel J. Evans School of Public Affairs at the University of Washington.

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