



# Solving Traffic Congestion

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in the Baltimore-Washington Metro Area

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# Executive Summary

While many argue that traffic congestion is, and may always be, a fact of life, capitulation will not remedy the environmental devastation and economic inefficiencies brought about by traffic congestion. The solution to traffic congestion has been building more roads for the past 50 years. This solution is politically viable because taxpayers see the tangible results of their tax dollars. Unfortunately, that result is more acreage of ugly, impermeable concrete slabs and even more cars on the road. In order to be more economically and environmentally sustainable, the State of Maryland needs to establish a long term transportation plan that includes an infrastructure overhaul that makes long distance rail a viable alternative, promotes new technologies, and makes people aware of the “real cost” of driving. In order to address the problem of traffic congestion in the Baltimore-Washington metro area, the State of Maryland must act

quickly but also think to the future. In the short term, heavily marketing and making incentives for telecommuting to the private sector can decrease the number of cars on the road. Taking slightly longer to implement, reevaluating and rerouting buses to accommodate the largest populations of employees would create a lasting impact on car travel. Finally, the State of Maryland needs to reopen the idea of the high speed rail system in the area and work diligently to restore a rail system that the area pioneered and relied so heavily upon in the past. Through public-private partnerships and value capture methods, among other means, all of these projects can be funded. Without sweeping change in the mindset of transportation planners we are at the forefront of an impending congestion nightmare that could cripple the economy and alter ways of life.

Traffic congestion is not just a burden in the Baltimore-Washington metro area, or in the United States for that matter, but a global dilemma. Most societies have gotten used to it and have come to accept it. While many argue that traffic congestion is, and may always be, a fact of life, capitulation will not remedy the environmental devastation and economic inefficiencies brought about by traffic congestion. Nevertheless, we must develop a plan to help lessen the impact of congestion, reduce gas emissions, and to better protect our environment. Traffic congestion is one of the leading causes of environmental degradation. When cars and trucks are stuck in traffic jams for a significant amount of hours, they emit greenhouse gases at a much higher rate than they do while moving at a constant speed. The gases that are emitted are notably dangerous and cause substantial damage to the environment. Some of these gases include carbon dioxide, nitrous oxide, and methane.<sup>1</sup>

These gases are destroying the by trapping heat over areas where gas emissions and traffic congestions are found. We can see this happening first hand in China. An

economic super power and technology giant with a thirst for natural resources, China also happens to be the host of the 2008 Summer Olympics, where we can see the effects of pollution first hand. China is now the world's leading emitter of carbon dioxide, just slightly ahead of the United States. Air pollution has taken over most of China's urbanized cities; creating smog so dense that on some days, visibility is less than a mile. One third of the country is now desert, more than three quarters of its forestland has disappeared, and eighty percent of the Himalayan Glaciers that feed the country's rivers could disappear by 2035. China has taken drastic measure to help



clear the air. Some of these actions include removing 30% of cars of the road, and shutting down plants.<sup>2</sup>

Traffic Congestion is not just an environmental issue though. It is also an economic issue in the United States and around the world. According to the American Road

and Transportation Builders Association (ARTBA), congestion is the reason for 5.7 billion gallons of wasted fuel annually. On top of that, lost productivity and wasted fuel in 2002 cost a staggering \$68 billion. And it will get worse. The projected cost of traffic congestion is estimated to surpass \$90 billion in 2009. The amount of time spent in traffic will continue to rise as well. By 2020, the average American motorist will spend up to 36 hours a year stuck in traffic. Average road speed is expected to drop from 42 miles per hour to 40 miles per hour during this same time period. All of this can be considered a “hidden tax” levied on American consumers for excessive driving.

### *Congestion Dilemma*

There are many options that could mitigate traffic congestion in the short term if the steps are taken to prove to people their necessity and benefit.<sup>3</sup> The problem, however, is that most of these solutions are only temporary as the principle of triple convergence shows. Let’s look at the effect of triple convergence when road capacity is expanded. If a highway is expanded, for a short period

of time there will be less congestion on that road. Then, people will see that road is less congested and it will soon be congested again. The increase in congestion is due to spatial, time, and modal convergence. Spatial convergence occurs because those who were taking alternative routes switch to the newly improved highway. Time convergence occurs because people who were traveling off-peak hours switch to peak hours in order to normalize their schedules. Modal convergence occurs because people who were using public transportation switch to their cars because it consumes less of their time.<sup>4</sup> Inevitably, only road pricing or raising the tax on gasoline are not affected by the principle of triple convergence.<sup>5</sup>

### *The Status Quo*

When Eisenhower envisioned the Interstate Highway System in the 1950’s it was of utmost importance to national defense. Since then, it has turned into the most used form of transportation in the United States. This emphasis on constantly expanding the highway system to accommodate this use has only fueled America’s love obsession with

the automobile further. Until 2005, the State of Maryland spent more transit money on the State Highway Administration (SHA) than all other transit agencies combined. If one was to exclude the WMATA, SHA spending would dwarf MTA spending by almost \$300 million in 2007.<sup>6</sup> Jim Motavelli puts the blind focus the United States has put on automobile travel in perspective in his book, *Breaking Gridlock*.

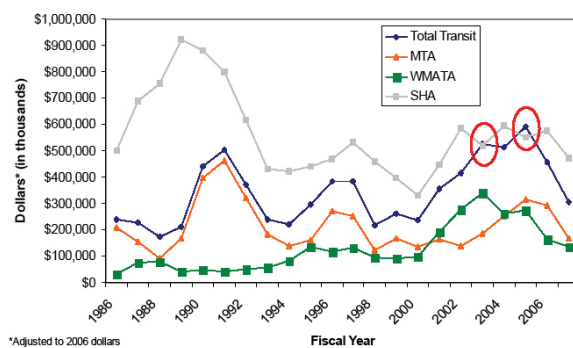
*Despite the fact that the national interstate highway system is completely built out, governments spend \$200 million every day constructing, fixing, and improving roads in this country. Traffic management and parking enforcement on those roads costs \$48 billion annually, and \$20 billion is spent on routine maintenance.*<sup>7</sup>

That is \$141 billion annually on the highway system. The problem with that amount of spending though is that it does not produce desirable results. He goes on to explain what these results are.

*The National Transportation Board predicts that delays caused by congestion will increase by 5.6 billion hours in the period between 1995 and 2015, wasting an unnecessary 7.3 billion gallons of fuel. The General Accounting Office, a federal agency, puts the loss of national*

*productivity resulting from traffic congestion at \$100 billion a year. Currently 70% of all daily peak-hour travel on interstates occurs under stop-and-go conditions, and a measurable*

### Transit Spending



*“rush hour” will soon be a thing of the past.*<sup>8</sup>

The solution to traffic congestion has been building more roads for the past 50 years. This solution is politically viable because taxpayers see the tangible results of their tax dollars. Unfortunately, that result is more acreage of ugly, impermeable concrete slabs and even more cars on the road. In order to be more economically and environmentally sustainable, the State of Maryland needs to establish a long term transportation plan that includes an infrastructure overhaul that makes long distance rail a viable alternative, promotes new technologies, and makes people aware of the “real cost” of driving. Even with the recent increase in gas prices, driv-

ing is relatively cheap. There is no reason for people not to drive. So much manpower and capital is put into making driving an automobile easier each year. What if those resources were moved to other transit improvements?

### *Long, Lost Rail*

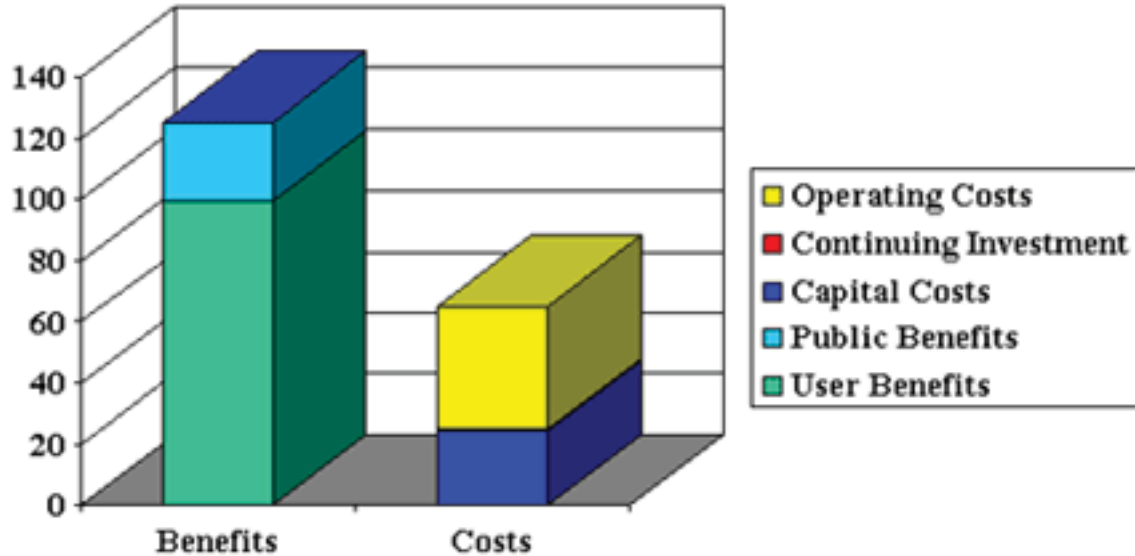
The rail system in the United States has been largely unchanged over the last 100 years. While Japan and Europe are speeding around in bullet trains, “modernized” Amtrak still offers diesel automotives pulling steel cars at a speed seldom topping sixty miles per hour”.<sup>9</sup> Light rail systems have become the popular rail upgrade in Maryland, but seemingly dangerous conditions and inconvenient routes and schedules make suburban to urban transport on its rails unappealing to most. What Maryland needs to do is invest in broad partnerships to modernize and rejuvenate the rail system through its suburbs and urban centers.

Since the creation of Amtrak in 1970, the percentage of travel by rail relative to other forms of transportation has plummeted. In 1970, “the airlines were about 17 times larger than the railroads, measured by passenger miles traveled; now they are more than 100

times larger. Highway travel was then about 330 times larger; now it is more than 900 times larger.” Most of Amtrak’s fleet is over 30 years old and the most recent Acela cars have over a million miles on them already.<sup>10</sup> By international standards, the rail system of the United States is in a state of emergency. The importance of an effective rail system is evident in the amount of passenger miles available and the relatively low environmental impact of electric trains. While Europe is expanding their high speed rail services, the United States is living with an Acela high speed service with limited routes and turtle-like speeds compared to those in Europe.<sup>11</sup> High speed rail has the ability to move the same capacity of passengers as air travel, but with a fraction of the harmful emissions.

### *A Viable Rail Solution*

In the early 2000’s, Maryland pursued Federal funding for a magnetic levitation transportation system, known as Maglev, to connect Washington and Baltimore as well as south into Charlotte and north to Boston. The 2003 report by the Task Force to Evaluate the Development and Construction of a Magnetic Levitation Transportation System outlined many of the benefits



and costs of such a system.<sup>12</sup> Opponents of such a system point to the huge upfront costs and the unique new challenges of such a large interconnected train system. These are very valid points but they fail to recognize the growing problem that is the highway system in this same area. The number of commuters between Baltimore and Washington will continue to rise. The roads are already overcrowded and the best way to remove cars from the road is to offer a viable solution that is both cheap and efficient. The proposed Maglev train could get passengers from Baltimore to Washington in just over 18 minutes.<sup>13</sup> Some estimate it might return 500% of its operating costs, though this number is extremely ambitious.

Since 2003 little has been done to pursue this project and serious consideration should be made for reinstating the project.

The most promising high speed rail proposal in the United States today is the one prompted by Governor Schwarzenegger in California. It is just the type of innovative system that other metropolitan areas such as the one in Baltimore-Washington need to solve some of its congestion problems. The California High Speed Rail (CHSR) proposal, which will be voted on by the citizens of California in November has the potential to revolutionize American transportation.

The CHSR system would remove millions of passengers from the highways, cut en-

ergy costs needed for travel by up to 80%, eliminate 12 billion pounds of greenhouse gas emissions each year, and reduce foreign dependence on oil by up 12.7 million barrels per year.<sup>14</sup> The Department of Transportation has designated areas for High Speed Rail but as you can see only one has come to fruition. The proposed CHSR service would more than double the average speed of the current Acela system to 220 mph. By funding and making incentives for the creation of a more efficient high speed rail service in this area, the Baltimore-Washington metro area could see greatly decreased automobile traffic. A new system would run on clean electric power as well as use off-grade crossings. With the airline industry in a time of uncertainty and the roads becoming increasingly congested, it is imperative to invest an environmentally viable and economically stimulating solution like high speed rail service.

### *A More Efficient Bus System*

Another means to mitigate traffic congestion in the Baltimore-Washington metro area is developing customized bus routes using computer technology. The current

bus system relies on cyclic bus routes. In such a system, the bus stops frequently to drop off and pick up passengers. The problem with this system is that it takes more time for a passenger to travel long distances when riding a bus than driving a car.

It is possible to create a system of customized bus routes by using a computer network as a model. In a computer network, individual bits of data travel along wires to their destination. In early computer networks, there were congestion problems with individual bits creating bottlenecks within the network. Computer designers solved this problem by combining these bits into packets and sending them to their destination. The packets of bits in a computer network can be compared to buses in an area's traffic network.

One proposed solution is to create customized bus routes using commuter information provided by companies and surveys. To do this, the MTA would need to obtain three types of information. They would need to know each commuter's origination point, destination point, and time of travel. With this information, bus routes can be created where there are limited number

of pickup points and a limited number of drop-off points. This would make it more convenient for the user. When enough of these routes are created, the traffic congestion problem could be greatly lessened. The customized bus route solution, which we propose, has never been tried before. It is different from any of the other solution that has been considered. In order for it to work, the system will have to be reliable and convenient for the commuter. This can be accomplished with proper planning.

### *Teleworking: A No Car Alternative*

Teleworking, or telecommuting, is a fast, short term solution for a reduction in traffic congestion. Maryland has done a good job of supporting telecommuters with programs like the Maryland Telework Partnership with Employers and the Telework Resource Center which is a commuter connections program. These programs need to be marketed more aggressively and implemented in the private sector of Maryland. The private sector needs to look to the state agencies for an example a well executed Teleworking policy.

Telework Centers offer optional workspace located closer to the employees' homes. Equipment includes computers, modems, photocopiers, fax machines, voice mail, internet access, meeting rooms, and videoconferencing capabilities. There are 17 facilities in the greater Washington region. It is also very easy to work from home with Maryland's policy being that agencies may provide equipment and office supplies such as laptops, desktop computers, and printers to be used by the employee only and "for purposes related to state business only."

"Telework reduces traffic congestion and air pollution emitted by vehicles," says Russ Ulrich who promotes telework programs as part of his work with the Baltimore Metropolitan Council. Both the worker and employer save on energy costs when teleworking, and much less time is wasted on the highway going to and from the traditional. Taking more vehicles off the road reduces congestion for other highway travelers who do need to go into the office that day.

The current policy for teleworking is good and must be implemented in the private sector so that all offices are taking part in

teleworking. It greatly reduces the number of cars on the highways in Maryland and helps the environment, not to mention the added job satisfaction. Teleworking is a win-win for employer and employee.

### *Financing Options*

There are numerous solutions for congestion problems, but the hardest part is picking the best solution for this situation and then raising the money to implement and maintain the solution. Some solutions pay for themselves through taxes. This is positive for the government but can be a major economic strain on citizens and business in the state. Other solutions require large amounts of money from the state to implement. This is negative for the state but the benefit of the citizens is very high. Improvements to our transportation infrastructure can increase property value, lower the cost for moving people and goods, and much more.

Many solutions for road congestion create revenue which pays for their creation and upkeep. These solutions include express toll lane, congestion pricing, dedicated bus

lanes, raising parking costs in urban areas and zone pricing in urban areas. Most of these solutions require an addition of a tax or an increase to an existing tax. According to Bardach in *A Practical Guide to Policy Analysis* “the most common conditions to which taxes are a solution are when there is inadequate government revenue for some purpose and – probably more important – when the structure of market prices fails to capture the true economic opportunity costs.”<sup>15</sup> Bardach also warns against the use of too many taxes which can greatly hurt economic and social activity.

Value capture is an exciting policy tool in transportation economics. Value capture is “a means by which to finance capital infrastructure, particularly transportation services, in a way that allows for efficient economic performance, simple administration, financial justice, and social facility.”<sup>16</sup> Defined more simply by Batt, value capture is the means by which capital infrastructure investment is financed through means of capturing either some or all of the added value of real property that results directly from that investment. One of the most compelling examples for

the use of value capture is the D.C. metro. In 2002, land in the Rosslyn-Ballston corridor in Arlington County was assessed at \$8.88 billion, an increase of 81% from 1992. This small corridor which has 5 WMATA stations is only 8% of the county land but generates 33% of county revenues through taxes. This jump in property values around transit stations shows the potential for capturing back the windfall gains that these property owners received from this publicly financed improvement to infrastructure. Such a value increase would be seen by implementing a high speed rail service that interconnects the many forms of mass transit in the area. Tax Increment Financing (TIF) is a value capture strategy which taxes the gains from property value caused by publicly financed improvements. In the TIF strategy the municipal bonds raised to pay for transportation projects are paid off by the increased property values through taxes. The length of the TIF varies for each project. TIF is a way to recapture the money that a publicly financed project creates. Joint development projects are another way to capture value. WMATA has done an

impressive 66 joint venture development projects since 1976 which has generated \$129 million in revenue by 2002. Building transit oriented developments in the area had attracted \$30 billion in private investment by 2000.<sup>17</sup> This form of value capture must be continued to be used in our state.

Special Assessment Districts (SAD's) are also used as a value capture strategy. The state designates districts in an area around a transit station and then requires payment of annual assessments for a set number of years. These annual assessments are used to pay off the bonds that financed the new transportation project. SAD's have been implemented 200 ft. around the New York Avenue station on WMATA's red line. Property owners must pay annual assessments for 20 years to pay off the \$25 million in bonds used to build the station.

Equity participation is another closely related value capture strategy. An example is the City of Albuquerque becoming an equity partner with the Arcadia Land Company by giving land, creating parking structures, and giving tax abatements for a 500,000 square foot commercial and residential develop-

ment near the Amtrak station downtown. Through this equity participation the city will receive 25% of the cash flow in years 6-12 of the project and 50% in years 12-20.<sup>18</sup> Value capture is also a financing tool for urban planning. Transit oriented development in urban areas focuses on other modes of transportation than automobile travel. The value can be captured when the property is built up around the transit, bus, or other transportation stations. Joint development and equity participation are both options being used in current projects and should be used into the future in the state.

A prime example of these strategies used together is in the Pearl District of Portland, Oregon. The city used two special assessment districts with TIF, parking fees, parking bonds, and federal and local transportation dollars to finance a streetcar system. Before this improvement, the Pearl District was a low density neighborhood but after this improvement and rezoning and rebuilding to high density living the district is thriving.<sup>19</sup> It is also possible to go car free in Pearl because of the transit oriented development. Value capture does have a downside. Nego-

tiation is a major aspect of value capture and one set formula can not be used for every situation. Peter Benjamin from Washington Metropolitan Transportation Authority states that, "Deals must always be structured carefully because there are two sets of tensions: First,

does the increase in value go to the local jurisdiction or the transit agency? And the second, since the most support you'll get for a project comes from those who stand to make the most profit from it, how much of the increased value can you take before you lose the interest of your development partners? The balance is struck jurisdiction by jurisdiction, site by site, project by project."



### *A Comprehensive Plan*

In order to address the problem of traffic congestion in the Baltimore-Washington metro area, the State of Maryland must act quickly but also think to the future. In the short term, heavily marketing and making

incentives for telecommuting to the private sector can decrease the number of cars on the road. Taking slightly longer to implement, reevaluating and rerouting buses to accommodate the largest populations of employees would create a lasting impact on car travel. Finally, the State of Maryland needs to reopen the idea of the high speed rail system in the area and work diligently to restore a rail system that the area pioneered and relied so heavily upon in the past. Through public-private partnerships and value capture methods, among other means, all of these projects can be funded. Without sweeping change in the mindset of transportation planners we are at the forefront of an impending congestion nightmare that could cripple the economy and alter ways of life.



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