Title: Transit Response to Congestion Pricing Opportunities: Theory, Policy And Practice in the United States

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INTRODUCTION

Congestion pricing is not a new economic concept or theory, having first been introduced into the transportation economics literature by Pigou in 1920 and Knight in 1924. Since that time, most transportation economists agree that congestion pricing is an efficient method to allocate limited roadway capacity with numerous papers and reports supporting the theory (Rouwendal and Verhoef 2006). Given the amount of academic horsepower that has gone into the theory, an important question becomes why has the concept not taken hold in the United States? Two primary reasons can be articulated: technical feasibility and political acceptability (Giuliano 1992). When congestion pricing was first proposed by Pigou in 1920, one of the largest barriers to implementation was technical feasibility, but with the rapid deployment of open-road tolling technologies and the emergence of the Vehicle Infrastructure Integration initiative, the technical limitations have mostly been addressed. Concerning the political acceptability, congestion pricing requires elected officials and leaders to reexamine the method in which transportation infrastructure is funded and what is considered *fair* regarding use of the infrastructure (Giuliano 1994). It is this later concern, *fairness* or *equity*, that has been the Achilles heel of many congestion pricing projects recently planned in the U.S.

Concerns about equity center around the effect that congestion pricing may have on lower-income groups (Viegas 2001). The economics literature suggests that these concerns can be mitigated somewhat because all income groups could conceivably benefit from congestion pricing depending on how the revenues generated are used[1]. Recently, an NCHRP study regarding the public opinion of congestion pricing projects articulates equity as a key concern of the public as well as how revenue generated by the project is used (Zmud and Arce 2008). Weinstein and Sciara conclude that equity has a tendency to shape the overall design of the project which often includes

[1] For a more detailed discussion see Litman (2005), Small (2002), Weinstein and Sciara (2006), and Viegas (2001)

spending the revenue generated on alternate transportation options for users (Weinstein and Sciara 2006). This is supported by much of the literature suggesting that equity concerns can be mitigated by ensuring additional choices are made available to users primarily in the form of improved transit service funded by the revenue generated from the congestion pricing project.

Transit is seen as the necessary evil in order to make the overall project politically tenable. In the commissioned papers *Curbing Gridlock: Peak-Period Fees to Relive Congestions,* Kain suggests that little attention has been given to transit because the effects are complex and require a number of assumptions that are difficult to defend (Kain 1994). However, what the limited congestion pricing experience from around the world does show is that transit can play a major role if it is needed. According to Small's assessment of London's congestion pricing system, "…it was politically savvy to connect road pricing and public transit…and better service was made possible, desirable, and financially viable by congestion pricing itself" (Small 2005).

In short, while congestion pricing is a simple concept to explain, and one that economists routinely espouse as the most obvious solution to traffic congestion, it has not gained significant political traction within the United States even though many of the technical barriers have been addressed. Today, there are twelve operating congestion pricing systems in the U.S. with ten in the design or construction stage of the project life-cycle coming on-line within the next five years. Most of these systems have been seeded with federal funding as a means to demonstrate the benefits of congestion pricing, one of which is that transit will reap some type of reward from the revenue generated.

Given the mantra that equity concerns are addressed through the inclusion of transit as an alternate mode, the question becomes that with more than fifteen years having passed since the U.S. implemented its first congestion pricing system in California, what role has transit really played? The goal of this research is to answer this question. New initiatives by the U.S. Department of

Transportation (DOT), including more than $1 billion to further demonstrate congestion pricing in the U.S., provide the opportunity to address this question more in-depth. Additionally, two congestion pricing projects using private equity being constructed in the Commonwealth of Virginia that will bring on-line nearly 150 lane-miles of congestion pricing by 2013 further add to the available data from which to draw.

METHODOLOGY AND DATA

This research aims to fill the gap in the literature and has the following two research questions:

1) What role has transit played in U.S. congestion pricing projects currently in the operation, construction or design stage of the project life-cycle?
2) How have transit agencies responded to congestion pricing projects through service planning, operating practices, capital investment and institutional arrangements?

In order to investigate these questions a number of documents were reviewed and key persons interviewed. First, a macro-level analysis of 22 congestion pricing projects that were either operating or in the design/construction stage of the project life-cycle were identified based upon interviews with people at the federal, state and local level (see Table 1). This research purposefully excluded those projects in the planning stage since the overall role of transit was either too early to assess or was too vague in nature to be of any value. Second, for each of the 22 projects, data were gathered regarding overall project characteristics from a number of sources including planning documents, federal project applications, interviews with key project personnel, and project evaluations. Third, a ranking was given to each regarding both the involvement and impact of transit within the project. Finally, a micro-level analysis of two Virginia congestion pricing projects was undertaken. This analysis includes a more detailed review of the available planning documents associated with the projects and in-depth interviews with key personnel including the Virginia

Department of Transportation (VDOT) multimodal liaison, transit agency planning staff and the metropolitan planning organization transportation director.

The congestion pricing projects included in this assessment are listed in Table 1 below and are sorted there according to the operational year. The projects included in this research are geographically dispersed throughout the U.S. Also, the overall project length varies from smaller bridges (LeeWay) to longer corridors (I-95/I-395 HOT Lanes) to entire toll-road networks (New Jersey Turnpike Authority). Of the four congestion pricing types defined by FHWA, only two are represented by the data: variably priced lanes and variably priced toll roads. Most of the projects have consisted of conversions from HOV lanes to HOT lanes and all but two are being operated by a public agency. Included in the table are the following ten characteristics:

1. *Location*—U.S. city or county where the project is located.
2. *Length*—Length of the project in miles unless otherwise noted.
3. *Type*—Type of congestion pricing project based upon the U.S. DOT Federal Highway System classification system: variably priced lanes (VPL), variable priced toll road (VP-TR), cordon pricing (CP) or area-wide pricing (AWP).
4. *Status*—Current status of the project: operating, construction, or design.
5. *Operational Year*—Year the project began operation or is planned to begin operation.
6. *System Type*—Indication of whether the project is new construction (New) or conversion of existing roadway into a congestion pricing facility (Conversion).
7. *Operations*—Indication of whether the project is operated by a private or public entity.
8. *Transit Involvement*—A ranking of transit involvement in the overall congestion pricing project planning and design that was conducted independently by the author using available documents, reports, presentations, conference proceedings and discussions.

- **Low—**No existing transit service in the congestion pricing corridor. No mention of transit as an important element in the planning documents.
- **Medium—**Existing transit service in the congestion pricing corridor. Transit mentioned as an important element within the documents reviewed. Revenue from congestion pricing could be used to offer alternatives but no additional funding has been identified for transit improvements.
- **High**—Existing transit service in congestion pricing corridor. Funding is codified in state law for transit improvements or funding for transit improvements have been identified and made available.

9. *Transit Impact*—An assessment of the overall impact of transit because of the congestion pricing project. The assessment is based upon Kain's analysis of transit's likely response to congestion pricing which includes improvements in speed, reliability, ridership and load factors as well as an overall expansion of service (Kain 1994).
    - **Not Significant** (Not Sig.)—Transit service has been unaffected by the congestion pricing project (e.g., no improvement or service expansion).
    - **Significant** (Sig.)—Transit service has been improved as a result of the congestion pricing either through improved service and expanded operations.
10. *Transit Revenue Source*—Indication of where the source of transit revenue comes from.

Table 1 U.S. Congestion Pricing Project Summary

Project	Location	Length (miles)	Type	Status	Operational Year	System Type	Operations	Transit Effects		
								Involvement	Impacts	Revenue Source
SR-91	Orange County	10	VPL	Operating	1995	New	Private	Medium	Not Sig.	none
I-15 FasTrak	San Diego	8	VPL	Operating	1996	New	Public	High	Sig.	VPL Revenue
Katy Freeway (I-10)	Houston	13	VPL	Operating	1998	Conversion	Public	Low	Not Sig.	none
LeeWay	Lee County	2[a]	VP-TR	Operating	1998	Conversion	Public	Low	Not Sig.	none
Northwest Freeway (US 290)	Houston	14	VPL	Operating	2000	Conversion	Public	Low	Not Sig.	none
New Jersey Turnpike Authority	Various	148	VP-TR	Operating	2000	Conversion	Public	Low	Not Sig.	none
Port Authority NY/NJ	NY/NJ Interstate Crossings	6[a]	VP-TR	Operating	2001	Conversion	Public	High	Sig.	VP-TR Revenue
San Joaquin Hills (73) Toll Road	Orange County	15	VP-TR	Operating	2002	New	Public	Low	Not Sig.	none
I-394 MnPASS	Minneapolis	9	VPL	Operating	2005	Conversion	Public	High	Not Sig.	VPL Revenue
I-25 Express Lanes	Denver	7	VPL	Operating	2006	Conversion	Public	High	Not Sig.	VPL Revenue
I-15	Salt Lake City	38	VPL	Operating	2006	Conversion	Public	Low	Not Sig.	none
SR 167	Seattle	9	VPL	Operating	2008	Conversion	Public	Medium	Not Sig.	none
I-95 HOT Lanes	Miami	21	VPL	Construction	2009	Conversion	Public	High	Sig.	UPA Federal Grant
SR-520	Seattle	6.5	VP-TR	Construction	2009	Conversion	Public	High	Sig.	UPA Federal Grant
Golden Gate Bridge	San Francisco	1[a]	VP-TR	Design	2009	Conversion	Public	High	Sig.	UPA Federal Grant
I-95/395 HOT Lanes	Northern Virginia	56	VPL	Design	2010	Conversion	Private	High	Sig.	PPTA Negotiation
Swoop	San Diego	27	VPL	Design	2010	New	Public	High	Sig.	UPA Federal Grant
I-35W	Minneapolis	15	VPL	Construction	2010	Conversion	Public	High	Sig.	UPA Federal Grant
I-10	Los Angeles	28[b]	VPL	Design	2010	Conversion	Public	High	Sig.	CRD Federal Grant
I-110	Los Angeles	33	VPL	Design	2010	Conversion	Public	High	Sig.	CRD Federal Grant
I-210	Los Angeles	24[b]	VPL	Design	2010	Conversion	Public	High	Sig.	CRD Federal Grant
I-495 HOT Lanes	Northern Virginia	12	VPL	Construction	2013	New	Private	Low	Not Sig.	none

[a] These values represent the number of bridges and tunnels included as part of the congestion pricing project.

[b] Lane-miles of congestion pricing roadway

MACRO ASSESSMENT OF TRANSIT ROLE IN CONGESTION PRICING PROJECTS

As seen in Table 1, the involvement of transit within congestion pricing projects has been relatively high with 13 of the 22 projects receiving a rank of high while two were ranked medium and seven ranked as low. This analysis indicates that as part of the project design stage, transit has played an important role in shaping the congestion pricing project. For example, the I-15 project in San Diego, California was implemented as a tool to utilize available capacity on the HOV lanes on I-15 between Poway and San Diego as well as provide a revenue source to fund new transit service along the same corridor (Hultgren and Kawada 1999). Thus, transit had a vested interest in the success of the project. Other examples of “high” involvement for transit are the congestion pricing projects located in Colorado and Minnesota, both of which have legislation indicating that excess revenue generated by the projects can be used to fund transit service within the corridor. Finally, there are the nine congestion pricing projects funded as part of U.S. DOT *Fight Gridlock Now* program, which includes large federal grants to demonstrate congestion pricing as well as fund transit service as an integral part of those projects.

While transit *involvement* in congestion pricing projects appears to be substantial, the reality of how transit has been affected by these projects is quite different. An initial review of the data in Table 1 would indicate that the impact on transit has been substantial with 50 percent of the projects receiving a ranking of “significant” and 50 percent receiving a ranking of “not significant”. Taken in isolation this would indicate that most transit systems significantly benefit from congestion pricing projects. However, a more careful assessment shows something remarkably different. First, of the 12 operational projects, only two have had a significant impact on transit (compared to four of the 12 having a ranking of “high” in terms of transit involvement). This assessment indicates that while the potential for transit is high (measured by transit involvement), the reality is that the impact on transit has not been great for the operational projects (measured by transit impact).

Second, examining those projects in the design or construction stage reveals that each one that received an involvement ranking of “high” also received a transit impact ranking of “significant”. The reason is the revenue source for the transit improvements. All of the projects receiving a “significant” ranking for transit impact that are in the design and construction stage have a dedicated lump-sum source of revenue that will be used to make the transit improvements. These projects do not rely on the variability of revenue generated by the congestion pricing project through tolls and user fees. All but one of the non-operational projects will use a federal grant as the means to make the transit improvements. The funding arrangement of the non-operational projects is in stark contrast to the operating congestion pricing projects where those projects receiving a transit involvement ranking of “high” rely on revenue generated by the congestion pricing projects to make transit improvements with only two of the four receiving a transit impact rating of “significant”.

In the four cases where transit involvement was ranked “high”, all relied on revenue generated by the congestion pricing project to fund transit improvements. Only two of the four projects actually resulted in any type of significant impact to transit operations as a result of the congestion pricing. The first is the Port Authority of NY/NJ congestion pricing system implemented on the six interstate crossings, which has produced a significant increase in funding for multimodal operations (including transit). The second is the I-15 congestion pricing project in San Diego where revenue was used to establish a new transit service in the corridor. The other two operational congestion pricing projects (I-394 MnPASS and I-25 Express Lanes) have not generated enough revenue to cover all operational costs to date, let alone provide additional funding for transit improvements in the corridor.

The results of this macro-level analysis into the role of transit in U.S. congestion pricing projects revealed three common themes among the 22 projects.

1. *Transit Involvement is High, but Long-term Opportunities are Lacking*—Half of the operational congestion pricing projects that include high opportunities for improved transit service as part of state enabling legislation have not provided any revenue to the transit agency. Of the ten non-operational systems, none include specific language as to sources of revenue for improved transit service beyond those made available as part of an initial federal grant or project negotiation. The lack of on an on-going revenue source indicates that while transit is perceived to have an important role in the overall project, the long-term impact is by no means guaranteed.
2. *Congestion Pricing Projects with Significant Transit Impact Include a Dedicated Funding Source, Not Just a Portion of Revenue*—It is clear that transit has been included as a key player in most of the congestion pricing projects that are operating or are in the design/construction stage. However, there is a clear distinction between the potential for transit (indicated by its involvement) and the overall impact it has. Generally, those congestion pricing projects with a significant impact on transit included a dedicated source of funding independent of the expected revenue generated.
3. *Transit Must be a Major Partner*—In the two operational systems where transit had a significant impact, transit was an important project partner even though the role was different for each. One of the stated goals of the Port Authority of NY/NJ congestion pricing project was to encourage use of mass transit in corridors with transit alternatives *along with* reducing

traffic congestion. A similar set of goals was established for the I-15 FasTrack system. However, the same is not true for the other operational congestion pricing projects. For example, the Katy Freeway in Houston has the goal of utilizing excess capacity on the HOV lanes and the LeeWay project has the goal of reducing peak-period demand.

MICRO ASSESSMENT OF TRANSIT ROLE IN CONGESTION PRICING PROJECTS

The second dimension of this assessment was to assess how transit agencies have responded to congestion pricing projects through service planning, operating practices, capital investment and institutional arrangements. Based upon the data gathered from the 22 congestion pricing projects in the U.S., this was difficult to accomplish given that only one of the operational systems (I-15 FasTrak in San Diego) included a significant response to the operations of a congestion pricing systems through new transit service within the service area. The other congestion pricing project with significant transit impacts, Port Authority of NY/NJ, did not include any major modification to service planning, operating practices or institutional arrangements as a result of the project[2].

However, what was gleaned from the data gathering and assessment was an interesting difference between the two congestion projects currently being designed and constructed in Northern Virginia. These two projects will add more than 150 lane-miles of priced lanes to the region along some of the most highly congested corridors. Both are being constructed using private equity under the Virginia Public Private Transportation Act (PPTA). While the I-95/395 HOT Lanes include more than $195 million in funding for improved transit service, the I-495 HOT Lanes project includes no monies. The following case study assessment provides an overview of each project and concludes with an analysis comparing and contrasting the two.

[2] This should not be construed as a negative aspect of the project. The New York City metropolitan region already has the highest transit usage rate in the U.S. and any additional funding for operations and maintenance is important.

Northern Virginia Congestion Pricing Project Summaries[3]

I-495 Capital Beltway HOT Lanes[4]

Construction of the I-1495 HOT Lanes began in summer 2008 with an expected completion date of 2013. The congestion pricing project will include the construction of four new variably priced lanes along the Virginia section of the Capital Beltway between the Springfield Interchange and just south of Georgetown Pike. A consortium led by Flour-Transurban is financing and constructing the entire 14 mile project. When completed, the HOT lanes will allow transit and HOV-3 vehicles to travel free while SOV and HOV-2 vehicles will pay a variable toll based upon current travel demand in order to provide free-flow travel conditions. The Flour-Transurban consortium will hold a 75-year operating lease with any financial success (above and beyond benchmarks set forth in the PPTA agreement) shared with the Commonwealth of Virginia.

Initial acceptance of the HOT lanes project ran into local government and community opposition based upon the perceived exclusiveness of the lanes ("Lexus Lanes"), limited community involvement, and the lack of support for alternative modes of transportation (Hardy 2008). To address these concerns, the Flour-Transurban consortium began to include more community involvement and highlight the benefits to other transportation modes. For example, the literature describing the project labeled the HOT lanes as "HOV/Bus/HOT Lanes" to promote the multi-model nature of the project. Also, the consortium emphasized the infrastructure improvements being made will create more bicycle and pedestrian access points that currently do not exist on many of the bridges crossing the Capital Beltway.

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[3] The description and discussion of the I-495 and I-95/395 HOT Lanes projects was developed based upon and interview with Ms. Valerie Pardo, VDOT Multimodel Liason, on July 3, 2008.
[4] A more detailed description of the I-495 Capital Beltway HOT Lanes project is available at http://www.virginiahotlanes.com/beltway-project-info.asp

However, the role of transit within the HOT lanes project is still small, which may be a reflection of current transit service along this section of the Capital Beltway. Currently, no transit service operates on this section of the beltway due primarily to the unreliability of travel times even though two of the largest employment centers and housing areas with Fairfax County are located at either ends of the project: Springfield and Tysons Corner. The only transit service serving these two areas is Fairfax Connector Bus 401 operating on thirty-minute headways but using local streets adjacent to the beltway. Fairfax County (operator of the Fairfax Connector bus service) is currently creating a ten year long range bus plan and intends to incorporate the availability of the HOT lanes into this plan (Fairfax County Department of Transportation 2008). The Potomac Rappahannock Transportation Commission (PRTC) has listed the unreliability of travel time on the Capital Beltway as one reason they do not provide service to Tysons Corner from southern Prince William County (Hardy 2008). Ironically, however, PRTC will be operating an express bus service during construction of the I-495 HOT Lanes between Springfield and Tysons Corner as part of the work zone transportation management plan to mitigate mobility impacts as a result of the construction (Hardy 2008). Whether or not these express bus routes remain after construction is complete is not known.

I-95/395 HOT Lanes[5]

The I-95/395 HOT Lanes congestion pricing project will expand existing HOV lanes located on both I-95 and I-395 from two to three lanes and extend the lanes into Spotsylvania County near Fredericksburg. The HOT lanes will be variably priced and switch direction based upon peak period demand (northbound in the morning and southbound in the evening). Once complete, users will be able to use the HOT lanes for 56 miles from Fredericksburg to Washington, DC.

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[5] A more detailed description of the I-495 Capital Beltway HOT Lanes project is available at http://www.virginiahotlanes.com/i95-project-info.asp

The project is being pursued under the Virginia PPTA by the Flour-Transurban consortium where private equity will be used to build-operate-maintain the HOT lanes for a 75 year lease period with any financial success (above and beyond benchmarks set forth in the PPTA agreement) shared with the Commonwealth of Virginia.

I-95/395 corridor is currently used by many different transit agencies and operators including private bus service, express buses, local buses, heavy rail and commuter rail. In addition, there are numerous park-and-ride lots and subsequent slug lines. In a reflection of transit's heavy use within the corridor, I-95/395 HOT Lanes project includes a number of direct benefits to transit users. These benefits include infrastructure improvements such as more on/off ramps that will enable faster travel times, new transit stations, additional roadway capacity and a contribution by Flour-Transurban towards capital investment for transit (purchase of buses, construction of park-ride-lots, etc.). Because of this contribution, negotiated as part of the PPTA agreement, the Commonwealth Transportation Board instructed the Virginia Department of Rail and Public Transportation (VDRPT) to develop a comprehensive transit/TDM study for the corridor to better determine how the available funding could be used (VDRPT 2008).

Project Comparison and Analysis

While the two Virginia congestion pricing projects appear to be similar in terms of location, institutional arrangements, and the use of private equity to design-build-operate, the overall impact to transit will be very different. Table 2 provides a summary of the differences and commonalities between the two projects as they relate to transit impacts.

Table 2 Comparison of Transit Impacts for Virginia Congestion Pricing Projects

	I-495 HOT Lanes	I-95/395 HOT Lanes
Existing Transit Service	▪ Route 401 Bus Service (approximately 2 buses per hour during the service period)	▪ 127 buses per hour (peak) ▪ 10 Metrorail trains per hour 2 VRE trains every hour ▪ 2 Amtrak trains (peak)
Operating Agencies and Services within Corridor	▪ Fairfax Connector	▪ PRTC ▪ Metrorail ▪ Metrobus ▪ Virginia Railway Express ▪ Fairfax Connector ▪ AMTRAK ▪ Alexandria DASH ▪ Arlington ART ▪ FRED ▪ Private Commuter Bus ▪ Slug Lines ▪ Park and Ride Lots
Construction Type	▪ New	▪ Conversion ▪ New
Long Range Planning	▪ Included in CLRP	▪ Included in CLRP
Service Planning	▪ Fairfax Connector including service options on I-495 HOT lanes as part of10 year long-range bus plan.	▪ Extensive *Transit/TDM Study* conducted to determine most effective utilization of transit service on HOT lanes. ▪ Local agencies incorporating into service planning.
Operating Practices	▪ New express bus being implemented as part of work zone TMP.	▪ New BRT service being considered.
Institutional Arrangements	▪ PPTA	▪ PPTA ▪ VDRPT took lead role in developing *Transit/TDM Study*
Capital Investment	▪ None	▪ $195 million lump sum payment
On-Going Revenue Source[a]	▪ Potential for revenue	▪ Potential for revenue
Direct Benefits to Transit Improvements	▪ Transit operates free on HOT lanes	▪ Transit operates free on HOT lanes ▪ 28-mile southern extension of existing HOV lanes; ▪ 3,000 new park-and-ride spaces in the corridor; ▪ 33 new entry/exit ramp facilities; and ▪ In-line BRT station in Lorton. ▪ Enhancements to 12 existing bus stations

[a] Both projects include revenue sharing clauses that will provide Virginia with a portion of the revenue generated above certain benchmarks.

As seen in Table 2, there are a number of commonalities between the two projects. First, both are begin constructed under the Virginia PPTA. While each of these projects was negotiated separately, both do include a clause that enables Virginia to benefit from any success of the HOT lanes in terms of revenue generation above and beyond what is stipulated in the agreements. Thus, if there is more than projected demand for the HOT lanes, there is the potential for an additional revenue source for Virginia; but, whether it would be spent on transit is not known. Second, both projects have been included in the regional constrained long range plan meaning they will taken into account as part of the regional travel demand modeling efforts and service planning. Third, in both projects transit will be able to use the HOT lanes free of charge. In the case of the I-495 project this means new infrastructure on which to operate. For the I-95/395 project this means additional capacity and access points. Finally, construction of both will include new roadway infrastructure while the I-95/395 project also includes conversion of existing HOV lanes to HOT lanes. Previous congestion pricing projects which have converted existing HOV lanes to HOT lanes have included concerns about the impact on transit. For example, the SR 167 HOT lanes included construction of barrier separation which forced transit buses to alter their travel patterns on the lanes. However, conversion on I-95/395 will not have similar concerns since additional entry and exit points are being constructed.

What is most striking in Table 2 are the difference between the two projects in terms of existing transit service and the number of operating agencies within the corridor. The I-95/395 HOT Lanes includes significantly more transit service and agencies compared with the I-495 HOT Lanes project, which may have been a major factor in VDOT negotiating with the Flour-Transurban consortium a $195 million contribution towards transit improvements within the corridor as part of the PPTA. In addition, the existence of a strong transit user base more than likely contributed to the need to better articulate exactly how transit users would benefit as part of the I-95/395 HOT Lanes project. With the I-495 project, no transit user base existed except for a local bus service that operated on streets adjacent to the Capital Beltway. Thus, when an assessment was made as to current demand for transit among the three major activity centers (Springfield, Merrifield, and Tysons Corner) there were little data to use except the single bus route and speculation as to what type of demand may be created by the HOT lanes. However, with the I-95/395 HOT Lanes, the amount of existing demand was easily calculated along with future demand for new transit service.

The micro-level analysis of the two Virginia congestion pricing projects revealed the following observations:

1. *Presence of an Existing Transit User Base is Important*—In order for transit to be an integral player, an existing user base needs to be established. The I-95/395 project had a tremendous amount existing transit users whose concerns had to be addressed in order for the project to move forward. A similar transit user base was not identified for the I-495 project.
2. *Transit Agencies Need to Adapt Quickly to Congestion Pricing Projects*—Both the I-95/395 and I-495 HOT lanes projects have moved forward very quickly considering the length of time each has been in the planning stage. This presents a barrier to many transit agencies which are not able to adapt to such an aggressive schedule. In the case of the I-495 HOT lanes, the local operating agency has just begun to incorporate the new facility into their operations. A similar observation can be made of the I-95/395 project where VDRPT has produced an overall study about new transit service in the corridor but no changes have actually been made. The speed with which VDRPT has moved is in

contrast to VDOT which very quickly adapted to the congestion pricing proposals when they were submitted.

3. *Transit Agencies Need to Consider Innovative Operations*—There is little evidence to suggest any types of new or innovative operating practices are being considered for the Virginia HOT lanes which may be one of the more critical elements to ensuring transit benefits from congestion pricing. Taken together, the two Virginia congestion pricing projects provide an example of a network-based HOT lane application where new transit service could operate (Poole and Orski 2003). However, it requires extensive planning and changes to existing operations and infrastructure. For example, a BRT network could be established between Springfield and Tysons Corner with in-line stations along the HOT lanes ROW with pedestrian access via the bridges going over the roadway. Establishing a BRT network incorporating innovative operations, however, requires forethought prior to final design and construction.

CONCLUSIONS

The purpose of this research was to assess how U.S. transit agencies have taken advantage of opportunities provided by congestion pricing projects. Assessing these opportunities was accomplished by asking two questions: what role have transit agencies had in existing congestion pricing projects, and how have transit agencies responded to congestion pricing projects through service planning, operating practices, capital investment needs and institutional arrangements. In order to answer these questions, 22 congestion projects were identified in the U.S. with which roles of transit agencies were identified. Also, a micro-level case study analysis was conducted comparing two projects in the Northern Virginia region to better determine how agencies responded to congestion pricing opportunities.

The assessment of the 22 U.S. congestion pricing projects shows that while transit agencies have been included as important players in the congestion pricing projects, they have not had an active role to date. Of the 12 operating congestion pricing projects, only two have seen any type of significant impact on transit. Thus, while the involvement of transit has been fairly significant in congestion pricing projects, the overall impact on transit has been small. This is an important finding since much of the literature states that congestion pricing could be a means to better fund transit operations. What this analysis found is that very few congestion pricing projects resulted in long-term, on-going sources of revenue for a transit agency in order to provide new service or improve existing service.

However, the establishment of the U.S. DOT Urban Partnership Agreements and Congestion Reduction Demonstration programs may prove otherwise since a significant amount of the federal grants associated with these projects will be directly benefiting transit agencies. But, in terms of long-term opportunities for transit (e.g., new revenue sources for capital and operating expenses) none of these projects have demonstrated that to be a reality. For example, while creating a new source of revenue may be more attractive to transit agencies since many are heavily subsidized, a congestion pricing project will not guarantee this revenue stream. As seen with the I-394 MnPASS project, even though the law requires 50% of revenue be spent on transit within the corridor, current revenue generated by the tolls has not covered the cost to build, operate, and maintain the system (Howard 2005). Thus, a guaranteed lump sum payment (like the one being provided as part of the I-95/395 HOT Lanes) may be a more attractive option in order to address immediate needs.

The results of the Virginia case study analysis yielded interesting results about transit's response to congestion pricing projects. In comparing these two projects, there is evidence to suggest that transit agencies operating along both the I-495 and I-95/395 corridors have taken into account the potential opportunities made available to them in order to improve transit service as a result of the HOT lanes. VDRPT conducted a comprehensive analysis of transit opportunities as a result of the I-95/395 HOT lanes but did not consider a similar study for the I-495 HOT lanes, and Fairfax County will incorporate both projects into their on-going 10 year long range bus operation plan.

Overall, as more congestion pricing projects are implemented in the U.S. it will be important to continually monitor and evaluate the role of transit within these projects to ensure a *fair* and *equitable* transportation system is created. The two limitations of this research center upon the availability of data. First, there was little formal evaluation data concerning existing congestion pricing systems and the impact on transit. Many of the systems did have some limited data, but it did not provide any detailed assessment (e.g. before/after analysis) of transit operations. Second, the micro-level analysis of the two Virginia projects does not provide a complete picture of all types and flavors of congestion pricing in the U.S. However, this was an opportunity to make a true apples-to-apples comparison in order to examine transit agency response to congestion pricing projects. Future research should include more case studies in this level of analysis.

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