



THE SECRETARY OF TRANSPORTATION  
WASHINGTON, D.C. 20590

September 10, 2012

The Honorable John L. Mica  
Chairman  
Committee on Transportation and Infrastructure  
U.S. House of Representatives  
Washington, DC 20515

Dear Mr. Chairman:

This letter transmits the 2012 Report to Congress on the Value Pricing Pilot Program (VPPP). The 2012 report updates VPPP activities, highlights some key projects and findings, discusses lessons learned on projects implemented over the last 2 fiscal years, and presents some key programmatic activities that the Federal Highway Administration (FHWA) will support to help advance congestion pricing projects at the State and local levels.

Section 1604a of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU, P. L. 109-59) continues the requirement that the Secretary of Transportation monitor VPPP projects for at least 10 years and report to the Committee on Environment and Public Works of the Senate and the Committee on Transportation and Infrastructure of the House of Representatives every 2 years on the effects of the pilot programs. Specifically, the Secretary is required to report on the effects of value pricing programs on driver behavior, traffic volume, transit ridership, air quality, and the availability of funds for transportation programs.

According to the statutory requirements of VPPP, FHWA may enter into cooperative agreements with up to 15 State or local governments or other public authorities to establish, maintain, and monitor VPPP. Currently, there are 12 State-led programs and 2 city-led programs participating in the VPPP: California, Connecticut, Florida, Illinois, Maryland, Minnesota, New Jersey, New York City, North Carolina, Oregon, Texas, Virginia, Washington State, and the District of Columbia.

With the extension of SAFETEA-LU after September 30, 2009, VPPP continues to be available to States as a way to gain tolling authority, and FHWA continues to promote its application and use. Since May 2009, a total of \$30.7 million dollars in VPPP funds have been awarded to 12 States. The U.S. Department of Transportation continues to focus extensive efforts to address traffic congestion problems. With its outreach and technical assistance efforts, FHWA has provided many States with the information and resources needed to reduce traffic congestion through contemporary approaches to congestion pricing. The FHWA will continue to provide information and guidance to an increasing number of stakeholders while providing coordinated and comprehensive congestion pricing programs and working toward delivering a successful VPPP.

Page 2  
The Honorable John L. Mica

A similar letter has been sent to the Ranking Member of the House Committee on Transportation and Infrastructure and to the Chairman and Ranking Member of the Senate Committee on Environment and Public Works.

Sincerely yours,

Ray LaHood

Enclosure

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THE SECRETARY OF TRANSPORTATION  
WASHINGTON, D.C. 20590

September 10, 2012

The Honorable Nick J. Rahall II  
Ranking Member  
Committee on Transportation and Infrastructure  
U.S. House of Representatives  
Washington, DC 20515

Dear Congressman Rahall:

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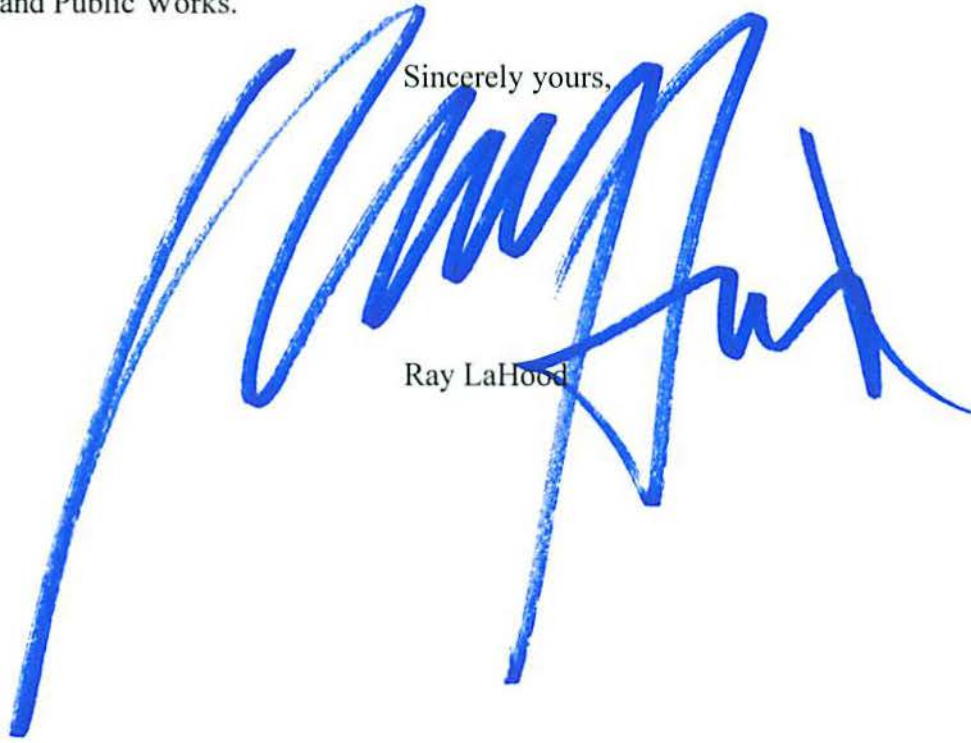
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Ray LaHood

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THE SECRETARY OF TRANSPORTATION  
WASHINGTON, D.C. 20590

September 10, 2012

The Honorable Barbara Boxer  
Chairman  
Committee on Environment and Public Works  
United States Senate  
Washington, DC 20510

Dear Madam Chairman:

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THE SECRETARY OF TRANSPORTATION  
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September 10, 2012

The Honorable James M. Inhofe  
Ranking Member  
Committee on Environment and Public Works  
United States Senate  
Washington, DC 20510

Dear Senator Inhofe:

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**Report on the  
Value Pricing Pilot Program  
Through April 2012**

May 2012

U.S. Department of Transportation  
Federal Highway Administration

# Table of Contents

<b>LIST OF ACRONYMS AND ABBREVIATIONS.....</b>	<b>IV</b>
<b>EXECUTIVE SUMMARY.....</b>	<b>VI</b>
<i>Key Findings .....</i>	<i>vii</i>
<i>Equity Concerns Are Being Addressed.....</i>	<i>vii</i>
<i>Congestion Reduction is Being Achieved.....</i>	<i>ix</i>
<i>The Use of Congestion Pricing is Spreading .....</i>	<i>x</i>
<i>Moving Forward .....</i>	<i>xi</i>
<i>Federal Highway Administration (FHWA) Program Plan for the Next 3 to 5 Years.....</i>	<i>xi</i>
<i>Conclusion.....</i>	<i>xii</i>
<b>INTRODUCTION.....</b>	<b>1</b>
<i>Background .....</i>	<i>1</i>
<i>The Value Pricing Pilot Program and Other FHWA Congestion Pricing Initiatives.....</i>	<i>2</i>
<i>Value Pricing Pilot Program.....</i>	<i>2</i>
<i>Urban Partnership Agreements and Congestion Reduction Demonstrations.....</i>	<i>3</i>
<i>The Current State of Pricing in the United States.....</i>	<i>3</i>
<b>THE VALUE PRICING PILOT PROGRAM: RESULTS AND EMERGING TRENDS.....</b>	<b>5</b>
<i>Projects Involving Highway Tolls.....</i>	<i>5</i>
<i>Projects Deployed Since 2009.....</i>	<i>5</i>
<i>Studies Completed Since 2009.....</i>	<i>7</i>
<i>Studies Underway that Have Been Awarded Funds Since 2009.....</i>	<i>10</i>
<i>Projects Not Involving Tolls.....</i>	<i>12</i>
<i>Parking Pricing .....</i>	<i>12</i>
<i>Priced Vehicle Sharing and Dynamic Ridesharing.....</i>	<i>16</i>
<i>Pay-Per-Mile/Pay-As-You-Drive Insurance .....</i>	<i>19</i>

Emerging Trends .....	21
<b>ACCELERATING CONGESTION PRICING IMPLEMENTATION: THE URBAN PARTNERSHIP AGREEMENTS AND THE CONGESTION REDUCTION DEMONSTRATION PROGRAM .....</b>	<b>25</b>
Summary of UPA/CRD Strategies by Site.....	26
<i>Variable Parking Pricing in San Francisco</i> .....	26
<i>Full Facility Tolling on SR 520 in Seattle</i> .....	27
<i>Express Lanes on I-85 in Atlanta</i> .....	28
<i>Express Lanes on I-35W in Minneapolis/ St. Paul, MN</i> .....	29
<i>Express Lanes on I-95 in Miami</i> .....	30
<i>Express Lanes on I-10 and I-110 in Los Angeles</i> .....	31
UPA/CRD Lessons Learned.....	32
<i>Communications and Outreach</i> .....	32
<i>Back Office and Technology Integration</i> .....	33
<i>Equity</i> .....	33
<b>PROGRESSION BEYOND VPPP AND UPA/CRD: HOW THE VPPP HAS HELPED ADVANCE CONGESTION PRICING IN THE UNITED STATES .....</b>	<b>34</b>
Managed Lane System Plans.....	34
<i>System-wide Pricing – Seattle Region</i> .....	36
Second Generation Variable Tolling Projects.....	36
<i>LBJ Express Project on I-35E and I-635 in Dallas, Texas</i> .....	37
<b>MOVING FORWARD: ADVANCING CONGESTION PRICING OVER THE NEXT 3 TO 5 YEARS .....</b>	<b>39</b>
Addressing Emerging Trends: The FHWA Program Plan.....	41
Current and Planned Outreach Activities.....	43
<i>Congestion Pricing Workshops</i> .....	44
<i>Webinar Series on Overcoming the Challenges of Congestion Pricing</i> .....	44

<i>Parking Pricing Workshops</i> .....	45
<i>Institutional Issues Peer Exchange</i> .....	46
<i>Publications and Information Products</i> .....	46
<i>Benefits of Outreach Activities</i> .....	47
<b>CONCLUSION</b> .....	<b>47</b>
<b>APPENDIX A. SUMMARY OF ONGOING CONGESTION PRICING ACTIVITIES AND RELATED RESEARCH</b> .....	<b>49</b>

## List of Acronyms and Abbreviations

A&AP	Awareness and Acceptance of Pricing
BTL	Bus Toll Lane
BRT	Bus Rapid Transit
CRD	Congestion Reduction Demonstrations
DOT	Department of Transportation
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HOT	High Occupancy Toll
HOV	High Occupancy Vehicle
ITS	Intelligent Transportation Systems
JPO	Joint Program Office
KTT	Knowledge and Technology Transfer
LPA	Locally Preferred Alternative
NEF	National Evaluation Framework
MBUF	Mileage-Based Road User Fee
MnDOT	Minnesota DOT
MnPASS	Minnesota Electronic Toll Operation System
MOE	Measure of Effectiveness
MPO	Metropolitan Planning Organization
NACTO	National Association of City Transportation Officials
NCTCOG	North Central Texas Council of Governments
O&M	Operations and Maintenance
P2P	Peer-to-Peer
PAYDI	Pay-As-You-Drive Insurance
PDSL	Priced Dynamic Shoulder Lane
PPP	Public-Private Partnership
PSRC	Puget Sound Regional Council
RITA	Research and Innovative Technology Administration
VPPP	Value Pricing Pilot Program
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SANDAG	San Diego Association of Governments

MTC	San Francisco Metropolitan Transportation Coalition
TEA-21	Transportation Equity Act for the 21st Century
TPB	Transportation Planning Board
TRB	Transportation Research Board
UPA	Urban Partnership Agreement

## Executive Summary

The U.S. Congress established the Congestion Pricing Pilot Program in Section 1210(b) of the Intermodal Surface Transportation Efficiency Act of 1991. It was subsequently renamed the Value Pricing Pilot Program (VPPP) under Section 1216 (a) of the Transportation Equity Act for the 21st Century (TEA-21) in 1998, and continued through the Section 1604(a) 2005 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). This is the only program that provides direct funding to support studies and implementation aspects of a tolling or pricing project. It has been a very popular program with demand for funding far exceeding availability.

A more commonly used term for "value pricing" is "congestion pricing."

Congestion pricing can reduce peak period congestion by charging motorists new or higher fees for use of roads during peak times in order to encourage drivers to shift to other travel modes, routes or destinations; to travel at other times of the day; or to forgo making the trip altogether.

The VPPP was intended to determine how and to what degree roadway congestion can be reduced or eliminated through the use of congestion pricing strategies as well as to ascertain the level of impact these strategies have on driver behavior, traffic volumes, transit ridership, air quality, and availability of funds for transportation programs. The program provides tolling authority and discretionary grants to State or local governments to facilitate the demonstration of congestion pricing applications and reports on their effects.

## Successfully Supports Department's Strategic Goals

Pricing is an important strategy in the DOT tool box that supports livability and sustainability goals because it can address transportation demand, support alternate modes, and raise revenues. It is clear that there are strong linkages in pricing projects to the livability and sustainability goals of the Administration. Pricing provides reliable and affordable transportation choices and supports alternate modes on travel. Results from pricing projects currently operating demonstrates that pricing supports livable communities by increasing transportation choices and access to transportation services. Most experience with priced lanes in the U.S. has been with High Occupancy Vehicle (HOV) facilities being converted to HOT lanes. Conversions allow some vehicles to shift from congested lanes, using the toll price to limit the degree of shifting and preserving the incentives for carpool and transit use.

Pricing supports USDOT's strategic goal of improving highway system performance. Pricing provides premium service options to choice users—for a price. It provides safe, reliable, effective, and sustainable mobility for all users. Most experience with priced lanes in the U.S. has been with High Occupancy Vehicle (HOV) facilities being converted to HOT lanes. The Miami 95 Express Lanes provide congestion free, high speed travel at 55-63 mph to ridesharing and paying customers during peak periods even while volume grows. The safety of all road users is an important strategic goal. A survey of Miami 95 Express users found that 60 percent of motorists surveyed felt that 95 Express was safe to very safe. Over 23 percent of those

surveyed use the express lanes to drive to and from work because they feel safer when driving in them.

Thus far, implemented projects have been valuable in demonstrating congestion pricing to the public, and meeting strategic goals by providing reliable travel times and enhancing public transit. Pricing serves a very important enabling role because improvements to the network make other modes more reliable, safer and attractive to users. For example, on the I-95 Express Lanes in Miami where the HOV requirement was raised from HOV 2+ to HOV 3+ and carpools must register, there was a 30 percent increase in transit ridership as a result of new bus service implemented to complement the new I-95 Express lanes.

Value Pricing projects continue to demonstrate the technical feasibility of pricing and have changed travel behavior. Priced lanes have also proven that many travelers are happy to have the option of paying for a guaranteed reliable trip. Furthermore, the VPPP's support of innovative congestion reduction strategies through the deployment of priced facilities has created more efficient use of the transportation network which offers citizens the opportunity to reach services and jobs.

## **Key Findings**

The VPPP projects and studies have provided many valuable lessons, but three key findings demonstrate the significant progress made in the past few years toward successful deployment of comprehensive congestion pricing strategies and programs:

- Equity concerns are being addressed through better planning and public outreach.
- Congestion reduction is being achieved in highway corridors and parking facilities where congestion pricing projects have been implemented.
- Pilot projects and studies are leading many metropolitan areas to develop managed lane systems and to integrate congestion pricing strategies into their regional plans and implementation programs to support larger regional congestion reduction and mobility goals.

### ***Equity Concerns Are Being Addressed***

Every congestion pricing proposal has confronted the concern that affluent travelers will benefit at the expense of lower income groups. Many have been delayed or even cancelled due to these fears. With the opportunity to assess actual impacts, operational projects have found, with few exceptions, that equity issues are not deal breakers and can be effectively mitigated.

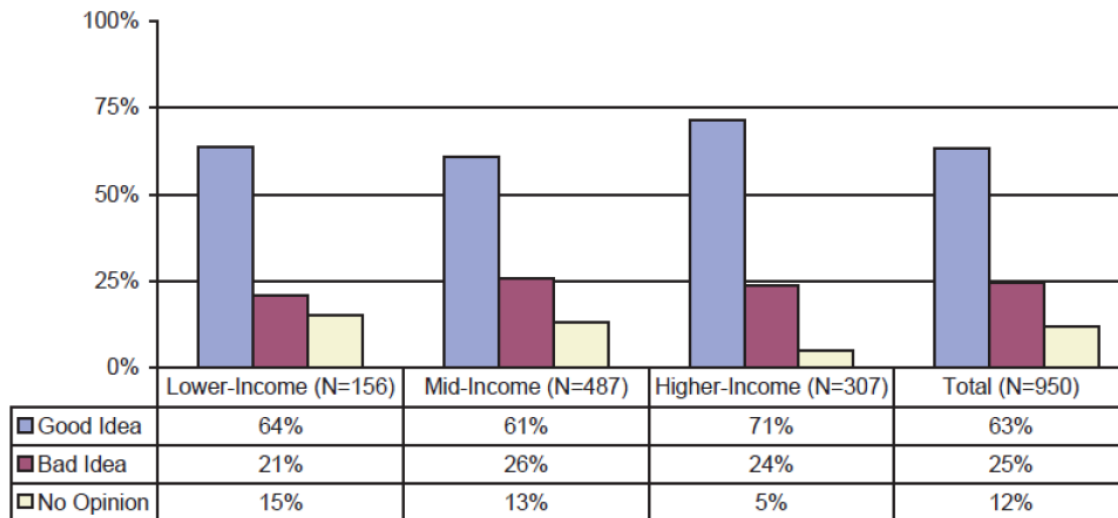


**Post implementation surveys have shown dramatic increases in the acceptability of congestion pricing as compared with pre-implementation surveys.** Figure 1<sup>1</sup>

shows the opinions of various income groups on allowing single drivers to use carpool lanes, post-implementation.

Although the level of support is highest among those in the high-income group (71 percent), there are also strong levels of support among low-income persons (64 percent) and mid-income persons (61 percent). Furthermore, those in the lower income group were the least likely to give a “bad idea” rating. In general, favorability has been fairly level across income levels. Focus groups and open-ended questions have revealed that lower and mid-level income travelers tend to have a high urgency of on-time arrival. Actual usage of many high occupancy toll (HOT) lane facilities—high occupancy vehicles (HOV) lanes that are free for HOVs but allow lower occupancy vehicles to gain access to the lanes by paying a toll—has been fairly balanced across income groups.

Actual usage of many High Occupancy Toll (HOT) lane facilities has been fairly balanced across income groups.



**Figure 1. Opinion of Various Income Groups on Allowing Single Drivers to Use Carpool Lanes**

Revenues from congestion pricing have been used to fund improvements that support lower income travelers and provide targeted subsidies and discounts. For example, under the Los Angeles Congestion Demonstration Reduction project to convert existing HOV lanes on the I-10 and I-110 freeways to express lanes (see page 31), Los Angeles Metro (the major operator of bus

<sup>1</sup> *I-394 MnPASS High Occupancy Toll Lanes, Planning and Operational Issues and Outcomes (Lessons Learned in Year 1)*, Lee W. Munnich, Jr., and Kenneth R. Buckeye, 2007, [http://www.hhh.umn.edu/centers/slp/transportation/congestion\\_pricing/pdf/I-394MnPassHigh-OccupancyTollLanes.pdf](http://www.hhh.umn.edu/centers/slp/transportation/congestion_pricing/pdf/I-394MnPassHigh-OccupancyTollLanes.pdf).

and rail service in Los Angeles County) will provide a discount of \$25 off of the \$75 fee required to set up a transponder and will waive the monthly \$3 non-user fee for express lane users with household incomes of \$35,000 per year or less. In addition, there will be a rider loyalty program for frequent carpool and vanpool express lanes users. Carpools can set their transponders to two or three occupants, and they are automatically enrolled in the loyalty program to earn gift card rewards. Three-person carpools are eligible for higher rewards.<sup>2</sup>

### ***Congestion Reduction is Being Achieved***

The majority of projects that have been implemented in the United States (U.S.) have involved "partial" pricing on one or more lanes of an existing free facility (partial pricing is the conversion of existing HOV lanes to HOT lanes; other open lanes are not affected), increases in peak period toll rates on existing toll facilities, and pricing not involving tolls, such as innovative parking management. Some implemented projects have documented increased travel speeds in adjacent general purpose lanes as a result of diverting traffic to the tolled express lanes and shifting to other modes. Travel time advantages for transit have been maintained for projects that involve converting HOV to HOT lanes through successful use of variable pricing and many projects, such as the I-95 Express in Miami, experienced a significant drop in transit travel times.

The first project implemented in the U.S. that involved introducing a new charge on an existing toll-free facility was on the State Route 520 (SR 520) floating bridge in Seattle, Washington (shown in Figure 2), which started tolling on December 29, 2011. In their application for funding<sup>3</sup>, the Washington State Department of Transportation (WSDOT) proposed to apply variably priced tolls on the existing bridge in order to manage demand.



Figure 2. SR 520 Bridge (Source: Washington State DOT)

The revenue generated through tolling the existing bridge will allow WSDOT to replace the existing floating bridge, which is nearing the end of its useful life. Very early results show a significant reduction in traffic during highly congested periods in favor of alternate modes and off-peak periods, indicating diversion of traffic out of the “peak of the peak” travel periods.

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<sup>2</sup> LA Metro, *Metro Express Lanes: Frequently Asked Questions*, July 2011, [http://www.metro.net/projects\\_studies/expresslanes/images/ExpressLanes\\_FAQ.pdf](http://www.metro.net/projects_studies/expresslanes/images/ExpressLanes_FAQ.pdf).

<sup>3</sup> The WSDOT application for VPPP funding is available at [ftp://ftp.wsdot.wa.gov/public/LocalPrograms/ProgramMgmt/GrantApps/VPPP\\_2012/WA-WSDOT\\_VPPP%202012/WA\\_WSDOT\\_Narrative%20Application\\_Express%20Toll%20Lanes%20Continuous%20Access%20Demonstration\\_VPPP%202012.pdf](ftp://ftp.wsdot.wa.gov/public/LocalPrograms/ProgramMgmt/GrantApps/VPPP_2012/WA-WSDOT_VPPP%202012/WA_WSDOT_Narrative%20Application_Express%20Toll%20Lanes%20Continuous%20Access%20Demonstration_VPPP%202012.pdf).

For more information on congestion reduction results, see the Miami I-95 Express Lanes project on page 31.

### ***The Use of Congestion Pricing is Spreading***

In May 2006, the U.S. Department of Transportation (DOT) announced the National Strategy to Reduce Congestion on America’s Transportation Network, also known as the “Congestion Initiative.” The intent of the initiative was to demonstrate a variety of innovative but proven strategies that could provide relief to traffic gridlock if more widely practiced. The Urban Partnership Agreements and Congestion Reduction Demonstrations (UPA/CRD) programs that resulted from the Congestion Initiative were designed to encourage more aggressive broad-scale pricing approaches. As a part of each program, multiple sites around the U.S. were awarded funding for implementation of congestion reduction strategies, including multimodal strategies to relieve urban congestion, such as tolling/pricing, transit, technology, and telecommuting/travel demand management.

Congestion Pricing in the U.S. is at a “tipping point,” whereby the successes of many of the initial HOT lane conversions (and other partial pricing projects) have led directly to much more comprehensive pricing programs.

The proliferation of pilot projects and studies through VPPP and UPA/CRD programs are leading many metropolitan areas to develop managed lane systems and to integrate congestion pricing strategies into regional plans and implementation programs. The Seattle and Puget Sound regions of Washington illustrate the progression from early studies of various aspects of congestion pricing, to implementation of a pilot HOT lane conversion project, tolling on existing non-tolled Interstate, and adoption of regionwide pricing in the Long-Range Transportation Plan.

The WSDOT, in conjunction with regional transportation partners (Puget Sound Regional Council (PSRC), Sound Transit, King County, and the city of Seattle), methodically studied many key aspects of congestion pricing prior to implementation of the agency’s first project on the SR 520 floating bridge tolling project, which was funded under the UPA/CRD program. The WSDOT subsequently applied many lessons learned to the opening of the SR 167 HOT lanes pilot project, a conversion from existing HOV lanes. Further, in December 2009, the regional planning agency, PSRC, adopted a strategic plan entitled *Vision 2040*<sup>4</sup>, which calls for regionwide pricing of all major roadways by 2030. This represents a very bold advancement of pricing in that on a vote of 98 percent in favor, this board consisting of elected officials was willing to take the political risk of supporting such a “radical” policy – the first of its kind in the country. Similarly, the SR 520 bridge project recently became the first in the U.S. to apply a

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<sup>4</sup> Puget Sound Regional Council, *Vision 2040*, December 2009 <http://psrc.org/growth/vision2040/pub/vision2040-document/>.

variable toll to all lanes of an existing non-tolled Interstate facility. (For more information about comprehensive regionwide pricing, also see the summary of the I-15 in San Diego and the San Francisco Bay Area HOV Lane Network project on page 7.)

## **Moving Forward**

Projects implemented under the VPPP have been valuable in demonstrating congestion pricing to the public and, in the case of HOT and Express Lanes, have provided valuable benefits, such as more reliable trips for travelers, and more travel options, such as reliable transit service. The technical feasibility of pricing has been proven, and the implementation of pricing projects has shown promising potential to change travel behavior. These projects have also proven that some travelers are happy to have the option of buying a reliable trip. Partial pricing projects have had measurable benefits, providing a choice for a reliable trip for those who need to be somewhere on time and reducing driver frustration. They have also made the concept of congestion pricing more familiar to the public, an important factor if congestion pricing is going to be implemented on a broader scope and scale. Partial pricing projects have gained acceptance from the public because they provide an additional choice, leaving in place prior options such as driving alone in congested traffic.

Due to their limited scale and scope, implemented projects have had positive but limited impacts on driver behavior, traffic volumes, congestion reduction, transit ridership, air quality, and funding for transportation. As the more comprehensive pricing programs evolve, a more sustainable transportation system will emerge. The metropolitan areas that implement extensive managed lane networks will be providing the option of reliable high-speed travel throughout the region. Unlike the traditional practice of adding new non-tolled lanes, active management of these systems will ensure travel time benefits for the foreseeable future. The travel time advantage for transit will help to provide efficient, sustainable transportation options for travelers across all income groups. Equally important is having a sustainable funding source through variable tolling for essential multimodal transportation improvements. Even if tolling will not pay in full for such projects, funding through tolling can accelerate projects in Regional Transportation Plans for delivery much earlier than the use of traditional public funding sources will allow.

### ***FHWA Program Plan for the Next 3 to 5 Years***

Over the next 3 to 5 years, Federal Highway Administration (FHWA) will support current initiatives as well as advance new thinking to evolve the state of the practice on congestion pricing along five tracks of activity:

- 1. Knowledge and Technology Transfer (KTT):** Taking the lessons learned from the VPPP projects as well as evaluations of other congestion pricing projects (e.g., UPA/CRDPrograms) and putting it into a format that other States and metropolitan areas

can use (e.g., brochures, fact sheets, Webinars, and workshops) to advance their plans and programs;

2. **Ongoing Project Monitoring:** As required by the VPPP statute, FHWA will monitor implemented VPPP projects for 10 years to help ensure a successful and effective project as well as to learn the important results and impacts that are transferable to other States and metropolitan areas;
3. **Conduct Issues-Oriented Research:** As issues facing State and local agencies in the implementation of congestion pricing program emerge through project monitoring, national conference discussions, and stakeholder input, FHWA will sponsor research that can guide agencies on how best to address these challenges. Examples of issues-oriented topics that will be researched include equity, achieving public acceptance, technology applications, public transit, analysis methods, enforcement, safety, and design.
4. **Facilitating a Dialogue:** FHWA will continue to work with State, regional, and local agencies, as well as national thought leaders and stakeholder groups, to facilitate discussions on current and innovative concepts and approaches to congestion pricing at national conferences (e.g., the Transportation Research Board (TRB) or Intelligent Transportation System (ITS) America), localized workshops, and specialty peer exchanges.
5. **Long Term Research:** Working with stakeholder groups such as the TRB, the FHWA will continue to support and help sustain a long-term program of research on congestion pricing through national programs such as the National Cooperative Highway Research Program (NCHRP) and the Transit Cooperative Research Program.

Through a series of outreach efforts that cross all five of these tracks, FHWA is working to ensure that agencies have not only the funding and authority to implement pricing projects, but also the resources, tools, and guidance required to implement projects successfully.

## **Conclusion**

The VPPP has been an effective Federal transportation program that has been critical for States and regions exploring and initiating pricing projects to manage congestion on State and regional facilities successfully. These projects have played a central role in introducing transportation professionals, political leaders, and citizens to pricing as a tool to address congestion problems and to manage our transportation system more effectively. The VPPP (along with the UPA and CRD projects) has led FHWA to frame a congestion pricing program involving technical assistance, outreach, and research over the next 3 to 5 years with respect to both tolling and non-tolling programs and projects.

## Introduction

### Background

The VPPP was established by the U.S. Congress as the Congestion Pricing Pilot Program in 1991. It was subsequently renamed the VPPP under Section 1216 (a) of the TEA-21 in 1998, and continued into Section 1604(a) SAFETEA-LU, P.L. 109-59 signed on August 10, 2005.

The purpose of the VPPP is to demonstrate whether and to what extent roadway congestion may be reduced through application of congestion pricing strategies, and the magnitude of the impact of such strategies on driver behavior, traffic volumes, transit ridership, air quality and availability of funds for transportation programs. The program provides tolling authority and discretionary grants to State or local governments to facilitate the demonstration of congestion pricing applications and report on their effects.

There is a consensus among economists that congestion pricing represents the single most viable and sustainable approach to reducing traffic congestion. Congestion pricing—sometimes called value pricing—is a way of harnessing the power of the market to reduce the waste associated with traffic congestion. Congestion pricing works by shifting some rush hour highway travel to other transportation modes or to off-peak periods, taking advantage of the fact that the majority of rush hour drivers on a typical urban highway are not commuters. By removing a fraction (even as small as 5 percent) of the vehicles from a congested roadway, pricing enables the system to flow much more efficiently, allowing more cars to move through the same physical space.<sup>5</sup> Similar variable charges have been successfully used in other industries, for example, airline ticketing, cell phone rates, and electricity rates.

#### WHY DO WE NEED CONGESTION PRICING?

##### In 2010:

- The average commuter endured 34 hours of delay per year. This will grow by 3 hours by 2015 and 7 hours in 2020.
- The cost of congestion was over \$100 billion and will rise to \$133 billion by 2015.
- Rush hour covered 6 hours of each weekday.
- 40 percent of delay occurred in mid-day and overnight hours.
- 1.9 billion gallons of fuel were wasted in congestion, rising to 2.5 billion gallons by 2015.

Source: Texas Transportation Institute  
2011 Annual Urban Mobility Report,  
<http://mobility.tamu.edu/ums/>

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<sup>5</sup> *Congestion Pricing – A Primer: Overview*, U.S. Department of Transportation, Federal Highway Administration, October 2008, [http://ops.fhwa.dot.gov/publications/fhwahop08039/cp\\_prim1\\_00.htm](http://ops.fhwa.dot.gov/publications/fhwahop08039/cp_prim1_00.htm).

Although drivers unfamiliar with the concept initially have questions and concerns, surveys show that drivers who are more experienced with congestion pricing support it because it offers them a reliable trip time, which is very valuable when someone has to be somewhere on time. Transit and ridesharing advocates also appreciate the ability of congestion pricing to generate both funding and incentives to make transit and ridesharing more attractive.

Through the VPPP, as well as follow-on initiatives such as the CRD, UPA, and Express Lanes Demonstrations, the FHWA provides key support to States to help them implement strategies to minimize the congestion problem. More importantly, findings from deployed projects continue to demonstrate that the application of innovative congestion pricing strategies can effectively manage demand on congested urban facilities.

## **The Value Pricing Pilot Program and Other FHWA Congestion Pricing Initiatives**

### ***Value Pricing Pilot Program***

The VPPP encourages implementation and evaluation of value pricing pilot projects to manage congestion on highways through tolling and other pricing mechanisms. This is the only program that provides funding to support studies and implementation aspects of a tolling or pricing project. The program is limited to 15 slots (which FHWA has reserved for States), of which only one vacancy currently remains. Each State can have multiple projects.

*“The VPPP has been critical for states and regions in exploring and initiating pricing projects.”*

– Lee Munnich, Jr.,  
University of  
Minnesota

The SAFETEA-LU provided a total of \$90 million for fiscal years (FY) 2005-2012 for the VPPP. For FY 2005, \$11 million was authorized, and \$12 million was authorized for each FY 2006 - 2009. Further, \$9.8 million was awarded to projects in FY 2010, \$8.1 million in FY 2011, and a yet to be determined amount in FY 2012. Of the amounts made available to carry out the program, \$3 million was set-aside for each FY 2006 - 2009 for value pricing projects that do not involve highway tolls. Funds available for the VPPP can be used to support pre-implementation study activities and to pay for implementation costs of value pricing projects. With the extensions of SAFETEA-LU, the VPPP continues to be available to States as a way to gain tolling authority, and FHWA continues to promote its application and use. Congestion mitigation, environmental concerns, and limited funding for highway construction has led to increased interest by State, regional and local transportation agencies in congestion pricing as a strategy to manage congestion on oversubscribed roads. As a result, the DOT has made several other congestion pricing funding programs available to help agencies implement congestion pricing strategies.

### ***Urban Partnership Agreements and Congestion Reduction Demonstrations***

In May 2006, the DOT announced the National Strategy to Reduce Congestion on America's Transportation Network, also known as the "Congestion Initiative." The intent of the initiative was to demonstrate a variety of innovative but proven strategies that could provide relief to traffic gridlock if more widely practiced. The UPA/CRD programs that resulted from the Congestion Initiative were designed to encourage more aggressive, broad-scale pricing approaches. As a part of each program, multiple sites around the U.S. were awarded funding for implementation of congestion reduction strategies.

Under the UPA program, DOT sought applicants to use multimodal strategies to relieve urban congestion, including tolling/pricing, transit, technology and telecommuting/travel demand management. In August 2007, UPA project funds were awarded to New York City, Seattle, San Francisco, Minneapolis-St. Paul, and Miami. Subsequently, New York City was unable to meet the terms of their agreement and, therefore, is no longer able to participate in the program. As a follow-up to, but separate and distinct from the UPA program, the DOT published a Solicitation of Applications for Funding of CRD Initiatives in the November 13, 2007, Federal Register. In 2008, DOT awarded CRD funds to Los Angeles and Atlanta.

### **The Current State of Pricing in the United States**

Congestion Pricing, both for tolling and non-tolling types of projects, is getting more visibility, attention, and consideration in local plans and programs as a result of the VPPP projects and FHWA efforts to make State, regional, and local agencies aware of congestion pricing strategies. Many metropolitan regions have found that Federal funding, whether from the VPPP, UPA, or planning grants, represents a real opportunity for advancements in pricing projects. In that, the Federal Government feels that such grants are worth their investment (in funding and staff time), the sense of importance of the pricing projects is elevated at the local or State level.

The VPPP is currently the only Federal program specifically designed to provide funding to support congestion pricing studies and implementation of new and promising highway and non-toll projects such as parking pricing and distance-based pricing projects. The Federal investment in the VPPP has been particularly important in supporting States and regions as they take the initial steps toward implementing the most promising pricing strategies, generating local support for these challenging projects, and supporting comprehensive evaluations so all States and regions can learn about best practices. With relatively small grants, the VPPP has been able to give States and regions the tools and resources to implement these projects in the way that makes the most sense given local traffic, policy, institutional and acceptability considerations. Demonstration projects have not only balanced revenues against costs and gained general acceptance from travelers of all incomes, businesses, and environmental groups, but also demonstrated the potential of new financing approaches for maintaining, rehabilitating, and developing new roadways.



Market-based pricing is also being used to reduce congestion related to drivers searching for on-street parking, which is responsible for a significant proportion of downtown congestion in large cities (e.g., up to 30 percent in San Francisco<sup>6</sup>). Pricing is also being used to revise traditional toll structures to encourage traffic to spread from congested peak periods, an approach termed as “variable pricing.” Furthermore, metropolitan areas often include goals related to environmental quality, sustainability, and livability as a component of their long-range transportation plans. Congestion pricing, including parking pricing, can help areas with air quality problems to demonstrate their ability to attain or maintain air quality standards.

By making more efficient use of limited road space, congestion pricing as a tool saves money by reducing time spent in traffic congestion and reduces the need for costly and increasingly less financially feasible investments in new highway infrastructure. At the same time, the VPPP has demonstrated that congestion pricing is one of the most cost-effective tools that transportation authorities have when adding capacity to the highway system is warranted.

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<sup>6</sup> Shoup, D., *Cruising for Parking*, Spring 2007, <http://shoup.bol.ucla.edu/CruisingForParkingAccess.pdf>.

# The Value Pricing Pilot Program: Results and Emerging Trends

Since May 2009, a total of \$30.7 million dollars in VPPP funds have been awarded to 12 States: California, Connecticut, Florida, Illinois, Massachusetts, Minnesota, New York, North Carolina, Oregon, Texas, Virginia, and Washington. These funds were awarded for a variety of congestion mitigation implementation projects or studies.

For information on other VPPP projects, refer to the VPPP Quarterly Report at [http://www.ops.fhwa.dot.gov/tolling\\_pricing/value\\_pricing/projects/index.htm](http://www.ops.fhwa.dot.gov/tolling_pricing/value_pricing/projects/index.htm).

## Projects Involving Highway Tolls

### *Projects Deployed Since 2009*

#### **SR 237/I-880 Express Connectors in Santa Clara, CA**

The Santa Clara Valley Transportation Authority was awarded \$3,200,000 in VPPP funds in 2009 to implement the SR 237/I-880 Express Connectors project (shown in Figure 3). This project applies roadway pricing to relieve an existing freeway bottleneck at a gateway into Silicon Valley by variably pricing a carpool ramp that connects carpool lanes on two freeways. The project is the first part of a roadway pricing program to implement congestion pricing throughout the Silicon Valley. The project opened to traffic in March 2012. Results from this project are providing valuable lessons from pricing applied to what is essentially a queue jump (2 miles one direction, 4 miles in the other direction) – the first of its kind in the U.S. A Queue Jump is a facility that can be used to bypass

*“VPPP funds have been instrumental in our efforts to get I-237/880 Express Connectors implemented.”*

— Casey Emoto,  
Santa Clara Valley  
Transportation

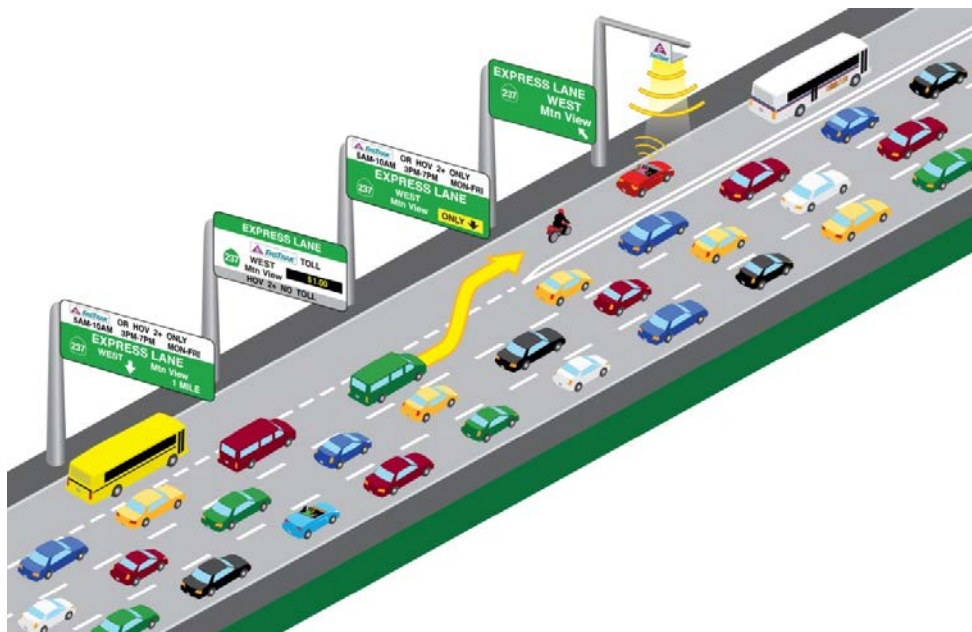


Figure 3. SR 237/I-880 Express Connectors (Source: Santa Clara Valley Transportation Authority)

points on the transportation network where congestion is particularly severe and occurs in a predictable pattern. Early results show significant travel time savings of up to 16 minutes, using the express connector as a carpool or by paying a toll.

### **I-680 Smart Carpool in Alameda County, CA**

Northern California’s first Priced Express Lane, covering 14 miles of I-680 Southbound from Highway 85 to Highway 237 (shown in Figure 4), opened September 20, 2010. This lane was previously operated as a carpool lane, and carpools, transit vehicles, and motorcycles are still allowed to use the lane for free. Between the hours of 5 a.m. and 8 p.m., the Express Lane is operated using dynamic pricing to ensure that traffic is always flowing smoothly. Express Lane users do not have the option of paying with cash; they must have a FasTrak toll tag mounted on their windshields. The Express Lane usage is still rising, as it hit a new high of toll trips in early February 2012. So far, more than a half million customers have chosen to pay the toll. Express Lane speeds are generally 7 to 10 miles per hour faster than the speeds in the other lanes during the peak morning hours.

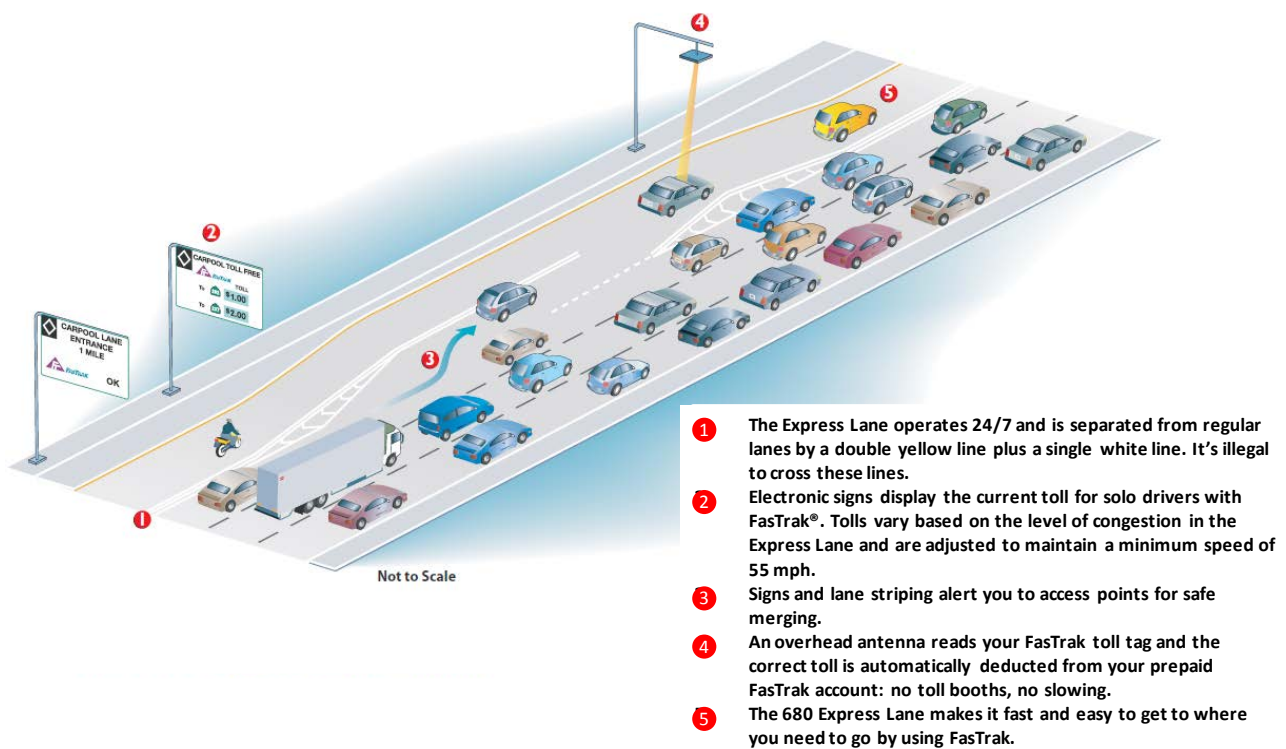


Figure 4. I-680 Express Lanes (Source: Alameda County Express Lanes)

### **I-15 Managed Lanes/BRT in San Diego, CA**

The San Diego Association of Governments (SANDAG) opened its first HOT lane conversion project on I-15 in 1996, utilizing grant funding and support from the VPPP. The original dynamically priced facility included two reversible lanes that went a distance of 8 miles. It proved to be a fertile testing ground for many congestion pricing concepts as well as a live “laboratory” to observe traveler behavior in response to variable pricing. Many other States and regions in the U.S., then in the concept development and planning stages, were observing very closely to see how the public would respond to the hot-button issues facing the fledgling industry, including privacy, equity, preserving transit travel speeds, and technology. The success of that simple HOT lane conversion project was instrumental in the expansion and extension of the concept to the creation of a major bus rapid transit (BRT) corridor. By experimenting with the original I-15 HOT lane, the region found that there was great potential synergy between congestion pricing and BRT to provide the most effective and efficient major transit improvement for that corridor. In January 2012, SANDAG opened the final segment of the now 20 mile managed lane. The four new express lanes also include a moveable barrier that allows up to a 3X1 configuration of the northbound and southbound lanes. The new lanes also feature a sophisticated pricing system that varies tolls for solo commuters based on distance traveled along with the amount of congestion in the Express Lanes. Light rail transit had been in the Long-Range Transportation Plan for decades for this same corridor, but a viable funding source had never been identified. The BRT now serves as the corridor’s fixed guideway system. The SANDAG has a major managed lane network defined in its long-range plan and design and planning on key corridors is underway.

### ***Studies Completed Since 2009***

#### **Area Road Charging and Parking Pricing in San Francisco**

This study, conducted in 2007 and awarded \$1,040,000 in VPPP funds, explored the feasibility of a congestion pricing program for San Francisco. By studying various potential congestion pricing scenarios, the study team established that congestion pricing could be a highly effective way of managing congestion, reducing greenhouse gas emissions, and supporting sustainable growth in San Francisco. The study found that benefits from a potential congestion pricing program could include 12 percent fewer peak period vehicle trips, a 21 percent reduction in vehicle hours of delay, and \$60-80 million in annual net revenue for mobility improvements.<sup>7</sup>

Two scenarios in particular were found to have the most potential: collecting a \$3 a day

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<sup>7</sup> San Francisco County Transportation Authority, *Mobility, Access, and Pricing Study*, December 2010, [http://www.sfcta.org/images/stories/Planning/CongestionPricingFeasibilityStudy/PDFs/MAPS\\_fact\\_sheet\\_111010.pdf](http://www.sfcta.org/images/stories/Planning/CongestionPricingFeasibilityStudy/PDFs/MAPS_fact_sheet_111010.pdf)

bi-directional toll from vehicles entering or leaving the Northeast cordon in the a.m. or p.m. peak hours, or collecting a \$6 a day toll in one direction from vehicles leaving the Northeast cordon in the p.m. peak hours. Revenues collected would be reinvested in transportation improvements for travelers in the Northeast cordon. In December 2010, the Transportation Authority Board voted in favor of pursuing an additional study of the congestion pricing concept, and the two most high-performing scenarios in particular. A decision on whether or not to implement congestion pricing is still at least 1-2 years away, following additional study and outreach. If that decision is made, congestion pricing would not likely be implemented in San Francisco before 2015.

### **Washington Express Lanes System Concept Study**

The WSDOT was awarded \$1,280,000 in December 2009 to conduct a Washington Express Lanes System Concept study. The WSDOT operates a 225 lane-mile HOV system as well as two reversible, general purpose express lane facilities (one of which will be replaced with light rail). Much of the HOV system has not met adopted speed and reliability standards for several years, impacting transit performance and costs. The WSDOT has proposed to convert the HOV and express lane system into a network of tolled express lanes that would continue to serve transit and carpools at no cost while allowing paying customers to enter the lanes for trips where timely arrival is particularly important. The price would be set dynamically based on traffic conditions in order to maintain high throughput and reliable speeds.

The WSDOT believes that an express lane system should be implemented to provide a consistent experience for its users throughout the region. This project identifies and recommends solutions for system-wide policy and design issues to define the express lanes concept for the Puget Sound region, develop specific implementation concepts for I-5, and propose system-level program staging that could be applied to complete the evolution from HOV lanes to tolled express lanes.

Recently, working papers were developed on user requirements and system design considerations, used by an interagency project coordination group to form initial system design and policy recommendations. Current efforts are focused on identifying potential express toll lane design concepts for I-5 between Tacoma and Everett, WA. The WSDOT executives are reviewing design concepts and key policy issues, with particular focus on HOV discounts or exemptions, use of photo tolling, pricing structure and access issues. The final project report is expected by September 2012.

### **Washington: Awareness and Acceptance of Pricing Project**

In 2007, WSDOT and the Puget Sound Regional Council received \$935,000 in Federal funding to test public awareness and acceptance of pricing (A&AP) and project-specific tolling concepts for use in refining those policies and projects. In addition, the agencies tested the effectiveness of communications strategies and tools to advance public awareness and acceptance of pricing.

The project was comprised of four key activities, all focused on understanding public acceptance issues that would enable or constrain broadening tolling to include corridor tolling and congestion pricing. These activities included:

- Regional coordination on operation, outreach and legislative issues;
- 520 Tolling Implementation Committee;
- Pricing Task Force Support; and
- Evaluation of existing and proposed toll projects.

When the project was initiated, the topic of tolls and congestion pricing was not new. The issue of pricing had been under discussion for several years in the Puget Sound region, but had been confined mostly to policy corners or agency planning studies. Figure 5 is from the final project report<sup>8</sup> and provides a view of the historical context for tolling in Washington that set the stage for the A&AP project.

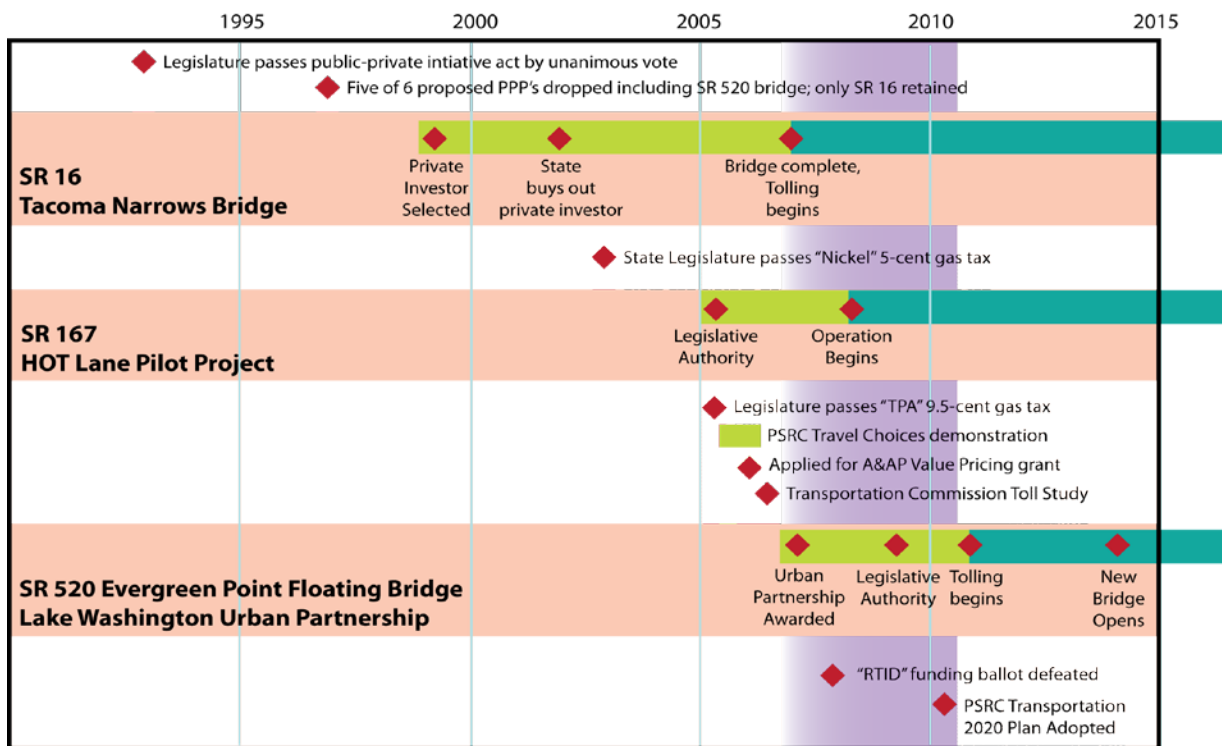


Figure 5. Public Awareness and Acceptance of Pricing Activities in Context of Washington State Tolling History

<sup>8</sup> Final Report: Awareness and Acceptance of Pricing Project, Washington State Department of Transportation and Puget Sound Regional Council, May 2011, <http://www.wsdot.wa.gov/NR/rdonlyres/FEC5D940-5B5E-4DE2-A3A3-E20B85894BDB/0/AAPReport052711.pdf>.

## *Studies Underway that Have Been Awarded Funds Since 2009*

### **Trunk Highway 77 Managed Lanes**

The Trunk Highway 77 Managed Lanes project in Minnesota was awarded \$540,000 in VPPP funding in June 2009 for a pre-implementation planning study that explored and tested a number of managed lane scenarios to provide a higher level of service for all users. Specifically, the study aimed to evaluate the potential for developing enhanced capacity in a highly congested 7-mile stretch of the existing corridor through the development of lane additions and the use of fixed/moveable barriers with shoulder lanes and/or contra-flow lanes. The analysis has been completed and the final report has been reviewed. Three primary alternatives to improve the capacity of the corridor were suggested.

The Minnesota Department of Transportation (MnDOT) worked with local stakeholders to come to a consensus on two alternatives to be moved forward into the environmental analysis and preliminary design phase. Letters of support have been received to conduct further study on two of the alternatives, and Phase II of this project will begin in the spring of 2012. This phase will be a partnership with Dakota County that will consider how MnPASS can be preserved as an option along with development of BRT in the TH77 corridor.

### **Charlotte Region Managed Lanes Study**

The North Carolina DOT and Charlotte Metropolitan Planning Organization (MPO) were awarded \$400,000 in VPPP funds in August 2010 for the third phase of a series of studies to determine where managed lanes should be implemented in the Charlotte region to help manage congestion during peak travel periods. One of the primary goals of this project is to familiarize the public with congestion and gain their acceptance of managed lane projects. Different approaches will be developed and tested to determine the strategies which are the most desired by the public and the corridors that have the greatest need for congestion pricing. A better understanding of the policy and technical issues associated with congestion pricing will also be developed throughout this project. This study began in January 2012 and is expected to take approximately 1 year to complete.

### **Regional Bus Toll Lanes in Tampa, FL**

The Tampa-Hillsboro Expressway Authority was awarded \$800,000 in VPPP funds in August 2010 to advance the first regional network of bus toll lanes (BTL) in the Tampa area. The BTL is a highway-based transit solution that aims to create a financially sustainable transit service by combining funding resources and operational capabilities of public transit and toll agencies. The BTL is a price-managed lane with up to 10 percent of the capacity dedicated strictly to bus-transit. While buses would travel without paying the toll, the BTL would be open to use by all light-duty 2-axle vehicles and would be price managed to assure the desired level of service on the facility. The BTL would maximize passenger throughput by employing proven bus technologies, all electronic open road tolling and dynamic congestion pricing techniques. The

final work plan and schedule for the study have been developed, and a number of outreach and organizational meetings are underway.

### **The Public Acceptability of Road-Use Pricing**

The National Capital Region Transportation Planning Board in partnership with the Brookings Institution received a \$320,000 VPPP grant in 2011 to investigate issues related to the public acceptability of road-use pricing. Using the Metropolitan Washington Region as a case study, this project conducted five invitation-based, deliberative forums to explore attitudes toward a variety of pricing options, ranging from variably priced toll roads to system-wide vehicle-based pricing systems. These community forums took place between October 2011 and January 2012. By engaging the public in an extended exchange of ideas, opinions and reactions, the goal of the project was to identify challenges and opportunities that decisionmakers would face if they were to move forward with implementing options for road-use pricing.

The forums included presentations on the current and projected state of transportation funding and congestion. Participants were asked to consider three scenarios for congestion pricing. These scenarios include: 1) a regional network of variably priced lanes on all freeways as well as some major roadways; 2) pricing on all streets and roads (based upon a Brookings Institution proposal from 2009) using vehicle-based GPS systems; and 3) zone-based charges in which drivers pay a fee to enter (or to drive within) a designated area or zone (a "cordon"). Participant opinions about these scenarios were documented through keypad voting, notes taken by scribes, and paper surveys.

### **Recently Awarded Projects**

Based upon a solicitation for proposals, in August 2011 the following five projects involving highway tolls received VPPP grants:

- Pricing the I-84 Viaduct in Hartford, CT, and assessment of the impacts of environmental justice issues that resulted from the original construction of the viaduct.
- Full facility pricing on I-95 corridor from New York to New Haven, CT and identification of how toll revenues would be applied to provide strong support for transit.
- Application of pricing on an existing toll road in Illinois and evaluation of steps to mitigate equity concerns for potential low-income users. The project will also evaluate how transit could be integrated and financed through priced managed lanes.
- Examining environmental justice issues related to pricing I-30 in Texas, through the use of innovative ITS technology.
- Implementation of a peak period toll in conjunction with dynamic ridesharing (dynamic ridesharing is explained further in the next section of the report) on the existing congested toll road, 183A Turnpike in Texas.



These studies have either not begun yet or are in very early stages with nothing to report yet. More information about these studies can be found in the Appendix and in the VPPP Quarterly Report at [http://www.ops.fhwa.dot.gov/tolling\\_pricing/value\\_pricing/projects/index.htm](http://www.ops.fhwa.dot.gov/tolling_pricing/value_pricing/projects/index.htm).

## **Projects Not Involving Tolls**

In recent years, a significant portion of VPPP funds have been awarded to projects that do not involve highway tolls. The majority of these projects fall into one of three categories: parking pricing, priced vehicle sharing and dynamic ridesharing, or pay-per-mile initiatives.

### ***Parking Pricing***

Parking pricing encompasses parking policies that rely on market forces to influence the decision to drive, including variable pricing of curbside parking, commuter parking taxes, and parking "cash out" programs that require employers to provide their employees with the option to take the value of free or subsidized employee parking in cash in lieu of using the parking space provided by the employer.

### **Parking Pricing Projects with Recent Results to Report Managing Residential Parking in San Francisco with Carsharing and Unbundling**

This study examined the effects of two residential parking requirements in San Francisco: that residential projects of 50 units or more offer one or two carshare spaces, and that off-street parking at residential projects of 10 units or more is "unbundled," meaning leased or sold separately from the property. The study found these policies resulted in a significantly lower rate of household vehicle ownership and a higher rate of carshare membership, and that carshare positively influences residents' decision of where to move. The most significant finding of the study is that the combination of unbundling parking with on-site carsharing vehicle access corresponded to an average vehicle ownership rate of 0.76 per household, which was a statistically significant reduction from the statistically indistinguishable rates of 1.03, 1.09, and 1.13 vehicles per household, where buildings had neither, just carsharing, and just unbundling, respectively. Clearly, then, there is a market for housing with unbundled parking and carsharing where customers respond with reduced vehicle ownership, and presumably take some of their savings and spend it for better housing and to occasionally use carsharing. The study also found a statistically significant difference in commuter mode choice between those with carsharing memberships (83 percent of whom used non-auto commute modes) and those without such memberships (only 70 percent of whom used non-auto commute modes). Relatedly, the presence of both carsharing and unbundled parking within a building was associated with a statistically significant increase in carsharing membership rates to 48 percent, versus 23 percent when the building only included carsharing, 20 percent when the building only unbundled

The San Francisco study found that carsharing policies resulted in a significantly lower rate of household vehicle ownership and a higher rate of carshare membership, and that carshare positively influences residents' decision of where to move.

parking, and 25 percent when the building neither unbundled parking nor offered on-site carsharing (the latter three all being statistically indistinguishable from each other).

### **Parking Pricing Incentive Alternatives to Monthly Parking Passes in the Twin Cities, MN, to Discourage Daily Driving**

This research targeted purchasers of monthly parking passes and examined the effects that the various alternative incentives tested as part of the study, which were bundled with the parking pass or offered in the form of a restructured parking pass, had on parking utilization and commuter mode choice. Programs tested included: *Buying Flexibility*, where a heavily discounted monthly transit pass (i.e., \$20 instead of \$130) was made available for purchase in combination with the parking pass (despite very heavy marketing, only 14 people purchased this, and while results clearly seem to indicate reduced parking and more transit use, the sample size was too small to find statistical significance); *Disincentive Removal*, where a monthly transit pass was provided for free to purchasers of monthly parking passes; *Marginal Rebate*, where not only was a monthly transit pass provided free to purchasers of monthly parking passes. Also, those taking transit instead of parking on any day of the month would receive a \$2 rebate, reflective of the marginal parking cost being \$7 per day and the marginal transit cost being \$5 per day, and; *PayGo Flex-Pass*, which is the same as *Disincentive Removal*, except that a rebate of \$7 would be provided on days where neither parking nor transit were used (with the total monthly rebate capped at half the cost of the monthly parking pass). The most successful of the incentive programs studied, *PayGo Flex-Pass*, led to the proportion of driving days declining from 78.5 percent to 56.5 percent, a huge reduction.

### **New York City – PARK Smart**

New York City Department of Transportation (NYCDOT) has implemented three “PARK Smart” parking pricing pilots since 2009 in Park Slope, Brooklyn, and Greenwich Village and the Upper East Side of Manhattan. Based on community support and feedback, NYCDOT has expanded and made permanent the PARK Smart programs in Park Slope and Greenwich Village. In Park Slope, metered parking is now \$2.00/hour during peak hours (12:00 p.m. to 7 p.m.) and \$1.00/hour off-peak. In Greenwich Village, metered parking is now \$5.00/hour during peak hours (6 p.m. to 10 p.m.) and \$3.00/hour off-peak. The extensive analysis and community engagement made possible by the VPPP grant allowed NYCDOT to tailor the pricing strategies and parking regulations to neighborhood needs. This meant addressing commercial loading concerns, expanding the peak-pricing area when each pilot was made permanent and tweaking meter shut-off times and time limits to improve curb performance. Overall results show that PARK Smart has been effective at managing parking demand. Interestingly, the results are more evident in parking turnover, where 18 percent more vehicles were able to find legal metered spaces as compared to pre-implementation levels a year earlier, than in curb occupancy. Occupancy levels, which were already high (over 90 percent) remained the same as pre-implementation levels. The fact that pricing has affected duration more than occupancy is likely due to the lack of off-street alternatives to metered parking in PARK Smart neighborhoods.

Finally, traffic volumes declined by 7 percent after implementation, partly due to drivers finding parking more quickly and spending less time circling. The NYCDOT is now working with three more neighborhoods to launch three more PARK Smart pilots this year. These pilots will involve peak rate parking and community-tailored curb management strategies to ensure that PARK Smart meets each neighborhood's unique parking needs.

**Priced Smart Parking Field Test at Commuter Rail Stations in San Diego.** This project was originally designed to address the problem experienced by the North County Transit District's COASTER commuter rail service—running adjacent to the severely congested I-5 in northern San Diego County— which had experienced constrained ridership due to the lack of available parking at transit stations. Parking at the five North County origin stations (encompassing 2,296 spaces in all) was typically full by 7 a.m. Shortly after successfully testing reserved parking, the economy slumped, and the market for such parking collapsed because declines in rail ridership and parking demand eliminated parking shortfalls. As a result, the project was restructured to focus on developing pre-implementation products to be of use when the market later recovers, including a Concept of Operations and System Engineering Management Plan for smart, paid parking. In addition, stated preference surveys and other data were used to determine the relative impacts on parking and ridership of increasing transit fares by \$1 round-trip or beginning to charge \$1 for commuter parking if revenues need to be raised from one of these sources. The results indicate that, where parking availability is not constrained, increasing fares would result in less ridership and revenue losses than charging for parking among park-and-ride commuters.

### **Parking Pricing Projects with Results Not Yet Available**

#### **Off-Peak Commuting Incentives and Parking Pricing at Stanford University**

This project focuses on learning about and using behavioral economics to design transportation pricing schemes in order to optimize consumer responses in furtherance of public policy goals. The project from Caltrans and Santa Clara County, with a central role played by a top-notch Stanford University team, has a critical built-in incentive for success in that Stanford University faces serious consequences if specific targets for the maximum number of vehicles coming to campus during peak travel times are not met. The project uses Radio Frequency Identification tags and a smartphone application to record vehicle entry and exit times and will be deploying a number of financial incentives, including lottery awards (which the principal investigator deployed in an enormously successful project designed to shift commute times in Bangalore, India) for drivers who avoid peak travel times. Daily incentives will also be deployed to discourage parking in the most over-subscribed lots instead of in less desired, more peripheral facilities.

#### **Parking Pricing and Real-time Guidance in Berkeley (City and University)**

This project will implement variable pricing of the 1,275 downtown on-street parking spaces in the city of Berkeley in order to meet an occupancy target of 85 percent (versus 665 off-street

parking spaces that the city owns and operates and 1,236 off-street spaces in privately owned facilities). On-street parking demand at current prices generally exceeds supply, while the off-street parking facilities almost always have excess capacity. Research shows an average of 30 percent of traffic on city streets results from motorists circling for available on-street parking and that appropriately pricing such parking would eliminate the congestion that circling motorists now cause. The city of Berkeley has already installed many multispace meters that accept multiple forms of payment and that are capable of being used for variable pricing. The project will support installation of new and enhanced real-time wayfinding capabilities, including variable message signs that display parking availability and price information for both on- and off-street parking, and will also enhance traveler information systems to provide this same information. The University has substantially increased monthly parking rates while holding daily rates steady. This encourages commuters to pay daily instead of monthly for their parking and to avoid driving and parking when possible. The University is exploring measures to further reduce monthly parking and to variably-price parking on campus reflective of parking location and occupancy. A range of complementary transportation demand management measures will also be deployed.

### **Incentives to Reduce Off-Street Parking Supply and Car Use in King County, WA**

This project promotes livability by using financial incentives to reduce the supply of and demand for parking in new developments and by providing new residents with a range of transportation choices that are less costly than car ownership. These, in turn, facilitate the building of more compact, transit-oriented communities. The project entails hosting forums and focus groups among developers, and later will design and then pilot incentive programs to reward developers and local governments for reducing parking supply/requirements and for facilitating transportation alternatives. A database and monitoring system are being created to gain a better understanding of parking demand, focused especially on the desirable situations where parking is priced, unbundled from unit costs, and paid for directly by consumers. Results will be widely disseminated. A local competitive grant program will also be established as an incentive for localities and developers to take aggressive actions to reduce parking supply and to promote alternatives to car ownership and use.

### **Commercial Delivery Parking Pricing in Seattle**

This project will be testing on-street parking pricing for delivery trucks in an area below and adjacent to the Alaskan Way Viaduct, where a 5-year reconstruction project will cause a loss of as many as 800 visitor, customer, and commercial parking spaces. The project entails collecting loading zone utilization data through in-street sensors; communicating space availability to delivery truck drivers and dispatchers through a smart phone/Internet application; enabling reservations of spaces; facilitating meter payment alternatives; and encouraging shorter stays through graduated pricing. A matched pair pilot and control area will enable the effects of the pricing and other system enhancements to be ascertained. End user information surveys will be

conducted. Price and policy changes are expected to evolve to best achieve availability targets in ways responsive to input from the delivery vehicle community.

### **Parking Pricing and Regulations Study in San Francisco**

This pre-implementation study is examining what sort of areawide parking pricing and policy strategies applied to both public and private parking would bring about a level of congestion reduction (curtailing 10-15 percent of vehicle trips) similar to a previously evaluated cordon pricing scheme. The focus will be on policies affecting commuter trips. Currently, about one-third of car commuters to downtown San Francisco pay nothing for parking, many more underpay, and even where there is no subsidy, daily costs are often masked by monthly parking products. Strategies to be examined include: pricing of parking lot and garage entry points; per-space parking regulatory fees; mandatory unbundling of parking from property leases and sales; increased taxes on commercial parking operations and leases; mandatory employer-based travel demand management and transit incentive programs; and various potential parking cash-out requirements. Local businesses and others seem more amenable to parking pricing than cordon pricing and this study might suggest a path forward that is responsive to business and public concerns and the related political reality. The project will support development and deployment of a new parking sub-model, led by the University of California, Berkeley. It will also support a host of outreach activities, and the development of proposed accompanying transportation system improvements, funded by new parking revenues, focused especially on enhancing equity such as through transit service upgrades.

### ***Priced Vehicle Sharing and Dynamic Ridesharing***

Priced vehicle sharing involves the provision of vehicles, typically by a commercial vendor, for use by members in exchange for an hourly or daily charge. The periodic rates for use can vary in response to demand or be fixed. Customers have the advantage of utilizing the vehicle only when needed and can avoid owning a car or reduce the number of cars in a family. Dynamic ridesharing involves matching of drivers and riders without preplanning of a car pool. The ride matching process can be conducted in real-time aided by smart phone technology or can occur at pre-designated pick-up locations. Priced dynamic ridesharing adds the element of cost sharing.

### **Priced Vehicle Sharing and Dynamic Ridesharing Projects with Recent Results to Report**

#### **Variably Priced Carsharing in Tampa, FL**

This project examined first the effects of overall hourly rate reductions and subsequently the effects of time-of-day and day-of-week pricing of carsharing<sup>9</sup> on utilization, where, after the

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<sup>9</sup> Carsharing is designed to replace car ownership for people who do not need to drive to work every day, and to significantly reduce congestion and greenhouse gas emissions. Carsharing is a service that provides 24/7 self-serve

initial across-the-board rate reductions, users were randomly assigned to either experience a 50 percent off-peak discount or not. The study showed that participants were significantly sensitive to changes in rental rates, both overall and based on time of day. A 20 percent discount from the base rate for sedans and a 33 percent discount from the base rate for a sport utility vehicle produced a very high price elasticity estimate of -1.59. These results indicate that variably priced carsharing could successfully shift usage from peak periods.

## **Priced Vehicle Sharing and Dynamic Ridesharing Projects with Results Not Yet Available**

### **Dynamic Ridesharing Pilot with Pricing Incentives in Santa Barbara**

Dynamic ridesharing is single-trip carpooling efficiently facilitated by telecommunications technologies and social networking structures, where participants need not bind themselves to travel arrangements until the last minute and make no long-term commitments. This project is implementing a technology-facilitated dynamic ridesharing project in the Santa Barbara region that includes a range of cash incentives to attract both drivers and riders to participate. The system is based on a global positioning system (GPS) enabled smartphone platform and involves commuters on two congested segments of U.S. Route 101. The program is initially recruiting 20 drivers and 20 riders in each of the two corridors (80 in total) by offering cash incentives and reimbursement for mileage and cell phone service. It will then expand to include 360 total participants (180 drivers and 180 riders) for a 12-month trial period.

### **Dynamic Ridesharing with Financial Incentives in Northern Virginia**

This new project will implement a dynamic ridesharing in program Northern Virginia, which includes a range of cash incentives to attract both drivers and riders to participate. The region is seeking to provide innovative transportation solutions, such as dynamic ridesharing, to lessen the pending traffic morass from the scheduled Base Re-Alignment and Closure (BRAC) job relocations. Led by the private-sector partner, Avego, the project will recruit 500 drivers and 1,000 riders, focused on those whose commutes are changing because of BRAC, for a 6-month pilot. Avego's dynamic ridesharing software will be coupled with GPS-enabled smart phones to facilitate finding and executing ride matches, tracking and recording of journeys, and transferring money automatically (mostly from riders to drivers, although riders will be provided "credits" to spend before having to contribute their own funds).

### **Peer-to-peer Carsharing in Portland, Oregon**

Peer-to-peer (P2P) carsharing will be implemented by Getaround, Inc., a company that has developed and successfully tested a low-cost enabling technology and system. The P2P carsharing, like neighborhood carsharing, converts all vehicle ownership costs to hourly rental

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access to a network of vehicles stationed around, which can be reserved by the hour or day via smart phones, internet and call centers. Source: <http://www.carsharing.net/>, accessed on April 23, 2012.

costs that include insurance and gas. Human contact is not required for any part of the transaction. In a rigorous San Francisco study, carsharing was shown to lead 29 percent of participants to sell a personal vehicle and over 60 percent of participants to forego a vehicle purchase. The P2P carsharing could be offered at a lower cost than for vehicles leased exclusively for carsharing, enabling less dense and poorer areas to be served, and making shifting from car ownership to carsharing more attractive. Participating car owners will be able to maximize their revenue potential by using their own vehicles as infrequently as possible (and leaving them in the shared-vehicle fleet), further reducing congestion.

The project is designed to create a fleet of between 333 and 475 vehicles. In-vehicle technology will be installed to allow renters access to the vehicles at times the owners choose to make them available, and also to collect data on mileage and time of driving. The project will have a peak-period surcharge default and will uniquely offer Pay-As-You-Drive-Insurance (PAYDI) priced by the hour to both vehicle owners and renters. Data will be collected from the GPS in-vehicle units, the reservation system, and participant surveys and will be analyzed by the Oregon National University Transportation Center.

### **Priced Electric-Assist Bicycle Sharing in San Francisco**

This project will test priced electric-assist bicycle sharing<sup>10</sup> at up to 25 locations, along with electric-powered bicycle trailers at up to 10 of the locations, in San Francisco and Berkeley adjacent to carsharing, including in areas where the federally funded *SFpark* parking pricing project is being deployed. The San Francisco Municipal Transportation Agency and San Francisco City CarShare will set an hourly price for the electric bicycles at 50-70 percent less than for cars, making the same reservation, access, and billing systems available for both. By providing prospective users an electric boost to help them pedal up San Francisco's hills, and electric-powered bicycle trailers (concentrated near supermarkets and in retail districts) to carry whatever purchases and other items need to be carried, the test will see how many carshare trips are replaced with electric bicycle/trailer trips. Travel behavior comparisons will be made between electric-assist bicycle sharing deployment neighborhoods and similar control neighborhoods, and between participants who are granted access to electric bicycles and a control group whose access will be temporarily restricted. Experienced researchers from the University of California, Berkeley, will lead the data collection, surveying, focus groups, and analysis.

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<sup>10</sup> A bicycle sharing system is a service in which bicycles are made available for shared use to individuals who do not own them. The central concept of these systems is to provide free or affordable access to bicycles for short-distance trips in an urban area as an alternative to motorized public transportation or private vehicles, thereby reducing traffic congestion, noise, and air pollution. Source: [http://en.wikipedia.org/wiki/Bicycle\\_sharing\\_system](http://en.wikipedia.org/wiki/Bicycle_sharing_system), accessed on April 23, 2012.

### ***Pay-As-You-Drive Insurance***

By converting fixed insurance costs to per-mile or per-minute-of-driving charges, Pay-As-You-Drive Insurance (PAYDI) encourages voluntary reductions in driving and related decreases in congestion, air pollution, and crashes. Because of these benefits, it has garnered much interest, including from some State departments of transportation, MPOs, and environmental groups. Pay-per-mile insurance projects in Washington, Texas, and Massachusetts recently received funding from VPPP. The project in Texas will try adding incentives for efficient travel choices.

### **Pay-As-You-Drive Insurance Projects with Recent Results to Report**

#### **Minnesota Mileage-Based User Fee (MBUF) Research and Outreach**

The MnDOT received VPPP funding in September 2006 to conduct statewide outreach on application of MBUF in Minnesota. Subsequently, in May 2011, MnDOT began conducting technical research of using MBUF as an alternative to fuel tax. This project developed into a statewide effort to investigate public understanding and opinions of mileage-based charges, via interviews with transportation experts and the public, focus groups with Minnesota drivers, a large sample qualitative public survey and an MBUF Policy Task Force that evaluates issues related to a potential MBUF system. The MBUF Policy Task Force issued its Final Report<sup>11</sup> in December 2011 with the following Summary of Recommendations: The MBUF approach is a potential supplement or an alternative funding method to Minnesota's current motor fuel tax. An MBUF system could be created that requires all drivers to pay their proportional share of roadway system costs while being flexible enough to be effective regardless of the type of future energy sources used for a vehicle. Still, MBUF is largely unfamiliar to the public and policymakers, and complex from the technical and policy standpoints. Many policy, technological and operational issues remain unanswered. Therefore, the Task Force does not recommend a statewide, full-scale implementation of MBUF until concerns are satisfactorily addressed. However, the Task Force recommends that exploration of an MBUF system for Minnesota continue to advance in a measured, informed, and thoughtful manner guided by the findings and recommendations presented above. Currently, MnDOT is conducting a technical demonstration with 500 participants from the Hennepin and Wright counties to test the effectiveness of using smart phone technology to collect MBUFs. This research is expected to be completed by December 2012.

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<sup>11</sup> Minnesota Department of Transportation (report prepared by Humphrey School of Public Affairs at the University of Minnesota), *Report of Minnesota's Mileage-Based User Fee Policy Task Force*, December 2011. <http://www.dot.state.mn.us/mileagebaseduserfee/pdf/mbufpolicytaskforcereport.pdf>



## **Pay-As-You-Drive Insurance Projects with Results Not Yet Available**

### **Ameriprise/NuRide Pay-Per-Mile Insurance and Supporting Incentives in Texas**

Studies indicate that PAYDI would save 64 percent of households an average of \$270 per year on each insured vehicle. The project includes Ameriprise Insurance and also an innovative outfit called NuRide, that partners with private companies in offering commuters, who find with NuRide's help alternatives to driving alone to work, incentives such as redeemable gift cards for popular establishments. The NuRide's system lists ride matches for requested times by the percentage of route overlap and allows users to limit searches by a host of factors, such as to a circle of personal friends and colleagues, to riders and drivers who other participants have rated highly, or to people of the same gender. This project will test the effects of PAYDI on driving and also the additional effects of the support and incentives offered by NuRide for ridesharing and other alternative-mode trip making. The Texas Transportation Institute is leading the evaluation and will be utilizing supplementary surveys, in addition to verified mileage to discern driving reductions from PAYDI pricing in itself and also with other monetary incentives.

### **Pay-As-You-Drive Insurance Implementation with Plymouth Rock in Massachusetts**

This project, a cooperative undertaking by the Massachusetts Department of Transportation, Division of Insurance, and Executive Office of Energy and Environmental Affairs—along with Plymouth Rock, the Conservation Law Foundation Ventures and the Massachusetts Institute of Technology (as the evaluator)—will offer real PAYDI. Over 3,500 participants will be enrolled and before-pricing driving data on all participants will be collected. There will also be monitoring of an additional 5,000 drivers who are never priced, to serve as a control. Different pricing protocols will be tested, varying the form of pricing (first using straight mileage pricing, then varying mileage rates by location and time of day), the timing of billing and payment (including a product where miles are paid for soon after driven, versus an alternative where drivers earn rebates for curtailing their driving), and the nature and frequency of communications to customers. Because insurance is very costly in Massachusetts, and also because the pilot will over-concentrate recruitment in congested urban areas where there are good transit and other alternatives to driving, it is expected that substantial changes in driving behavior will result, demonstrating the potential for big reductions in congestion if deployment were to be further expanded beyond the pilot. A thorough study plan was included with the application that, among other things, will ensure that effects of PAYDI not only on mileage, but on driving during congested times and in congested conditions, will also be discerned.

### **Pay-As-You-Drive Insurance with PEMCO Insurance in Washington State**

This pilot will install field-tested telematics recording devices on a sample of approximately 5,000 vehicles, collect baseline data, select a PAYDI premium structure, and roll out and test it in the State of Washington. In addition to mileage, the telematics devices will collect data on where driving occurs, total driving time, speed, time and day usage, routes, and aggressive stopping and acceleration, some of which may be incorporated into the premium structure.

Study participants will be recruited from PEMCO policy holders. Half of the participants in each experimental group will receive free transit passes along with the PAYDI. Participant surveys before, during, and after the study phase will address issues of customer satisfaction, changes in travel modes and travel behavior, use of transit passes, and intentions to continue with their current insurance policy. A control group, whose mileage and claims' rates will be measured just as for the experimental groups, will receive discounts based on traditional risk factors.

## **Emerging Trends**

Some key issues and trends that will become important in the coming years and will benefit from support under the VPPP include:

### **Integration Across Operational Strategies**

An emerging trend in congestion pricing programs is the integration of elements across operational strategies that include pricing and tolling, employer-based travel demand management programs, and ITS technologies like active traffic management and those that provide real-time traveler and transit information on personal communication devices. The I-35W Express Lanes project (see page 30) has incorporated dynamic pricing, active traffic management, variable speed limits, priced dynamic shoulder lanes, telecommuting, and other supportive technologies.

It will become increasingly important to implement these operational and demand management strategies concurrently, to help reinforce their impacts through synergies between them, while providing more choices to travelers. Congestion pricing programs in the future are likely to develop in this form.

### **A Systems Approach to the Use of Managed and HOT Lanes**

The managed lane and HOT lane facilities that have been planned, designed, and deployed over the past decade have had a corridor-level focus. The physical design and layout, operational approach, tolling policy and strategy, and concept of operations have been geared toward the local characteristics of the corridor and to meet the project's objectives. Many of the larger metropolitan areas in the U.S. have defined extensive managed lane networks in their long-range plans and are beginning to deploy multiple managed lane corridors. Over the next few years, the FHWA can provide valuable assistance to these regions as they prepare for a much more complex set of issues related to systems of managed lanes aimed at meeting regionwide goals.

Managed Lane systems require a cohesive regional approach. Self-funding managed lane segments are a good start as elements of the system; however, the major improvements in reliable trip times and congestion relief are maximized through regional systems. Up until this point, State and local transportation agencies have been willing to fund projects for which managed lane segments will pay for themselves. Systems require *regional* sharing of costs and revenues. Local transportation agencies in the San Francisco Bay region have built and have

extensive plans for managed lane projects that “pay for themselves.” One of the biggest bottlenecks in the regional transportation system, and thus a gap in the existing HOV network, is I-880 through Oakland. In this case, the toll revenues returned would be a fraction of the billions that would need to be spent for that specific segment to be expanded as managed lanes.

### **Collection of required data and detailed analyses to Improve Public Acceptability**

Acceptability is a common concern with tolling and pricing programs, but communication of robust analysis and data can successfully change public and decisionmaker opinions. The FHWA can play a crucial role in continuing to support technical evaluations of implemented programs and communicating the results and best practices to stakeholders. This outreach should focus not just on larger regions that may already be well on their way with planning pricing programs, but also smaller regions where incremental approaches such as parking pricing can best be utilized. This will allow smaller but rapidly growing regions to plan for and address system performance issues before conditions become worse. Making the case to the public is often the biggest challenge regions face, and the FHWA can support sharing information on communication strategies, messages, and vehicles to engage the public and decisionmakers effectively.

### **Performance-based Approach to Help Meet Regional Goals**

By helping to smooth traffic flows, reducing congestion, and generating revenues for multimodal transportation improvements, pricing strategies can help meet several measurable regional goals:

- Improved economic competitiveness through greater reliability and reduced external costs due to congestion delays;
- More livable communities with multiple travel choices including transit, bicycling, and walking;
- Environmental sustainability through reduced energy consumption, pollution, and greenhouse gas emissions;
- Maintaining a state of good repair within the transportation system by reducing costs for much-needed infrastructure upkeep as well as expansion through the optimal use of existing resources.

The FHWA can support rigorous analyses and the development of tools to evaluate impacts of pricing programs on specific performance, economic, and cost metrics. The comparison of these metrics between programs will facilitate an understanding of program features that lead to the most beneficial impacts for given costs.

### **Integrating Congestion Pricing into Regional Plans**

Activities under the VPPP have thus far provided valuable information about how pricing programs around the country moved from the planning phases through implementation, fulfilling planning requirements while under fiscal constraint, and strategically involving a multitude of

key agencies. As interest in toll and non-toll pricing strategies continues to increase, efforts such as the FHWA Congestion Pricing Primer Series, and results from recent workshops on advancing regional goals through pricing (all completed as part of the VPPP) will provide additional support to communities interested in pricing as a congestion management strategy.

Inputs from practitioners, stakeholders and decisionmakers gathered as part of these activities show that three key aspects are important to advance pricing programs at the regional level:

- Making a start by adding incremental project opportunities to regional plans, not necessarily starting with a big project;
- Using program revenues not only to achieve project objectives like equity, transit funding, and so on, but, in doing so, also to facilitate collaboration between concerned agencies; and
- Building partnerships and broad supporting coalitions from the ranks of research, industry, practitioners, as well as decisionmakers at the Federal, State, and local levels.

In all these aspects, the FHWA can play a significant role in continuing to provide lessons from a range of regions and institutional environments.

### **Establishing Supporting Tolling Policies**

A key mechanism for advancing consideration of pricing approaches at the regional level is to create a supporting policy framework that requires consideration of pricing as part of new projects. For example, recognizing that future infrastructure needs would not be met by existing revenue sources, the MPO for the Dallas region, the North Central Texas Council of Governments (NCTCOG), established a key three-step policy emphasizing that any additional capacity necessary in the region will be tolled, if warranted, to raise funds for regional capacity needs. The policy stipulates that: (i) all new limited access facilities have to be tested for tolling feasibility and built as toll roads, if warranted; (ii) when existing freeways are reconstructed, the feasibility of tolled express lanes should be tested and these should be built, if warranted; and (iii) free lanes or gas tax lanes will not be converted to toll lanes.<sup>12</sup> This policy laid the groundwork for several managed lane pricing projects that are currently being planned and constructed in Dallas.

Another way policies that support tolling could be implemented is through establishing guidelines for public-private partnerships (PPP) and providing authority to enter such

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<sup>12</sup> North Central Texas Council of Governments, *Regional Value Pricing Corridor Evaluation and Feasibility Study*, “Chapter 3: Guide for Applying Value Pricing in the Dallas-Fort Worth Region,” June 2005, <http://www.nctcog.org/trans/mtp/valuepricing/Chapter3.pdf>.

agreements; e.g., in Virginia, the State's Public-Private Transportation Act<sup>13</sup> enables it to work with the private sector to bring forward transportation improvements. The PPPs are increasingly being used to construct and operate pricing facilities, for instance, in Dallas, and Virginia.

Managed lane projects to date have fallen into two basic categories:

- Partial-pricing on existing HOV lanes, or minor expansion requiring relatively small investment, designed to offer a congestion-free option and typically pay for operations and maintenance (O&M) costs.
- Major managed lane expansion projects, funded by traditional public sources through a PPP, which will recover full costs through tolling.

### **Expanding Technology Transfer and Outreach**

There is a great wealth of reports, research, studies, presentations and other materials available in the areas of tolling and pricing, many of which have already been produced through support from the VPPP. The FHWA Office of Operations and Office of Innovative Program Delivery have been heavily involved in Congestion Pricing Outreach activities and products, including workshops, webinars, white papers, and primers for practitioners. These outreach activities and sources of information will need to be expanded to a wider range of regions considering pricing approaches that are at varying stages of conceptualization, communication, planning, and implementation.

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<sup>13</sup> The Commonwealth of Virginia. *Public-Private Transportation Act of 1995 (as Amended) – Implementation Manual and Guidelines*, December 2010, <http://www.virginiadot.org/business/ppta-default.asp>.

## Accelerating Congestion Pricing Implementation: The Urban Partnership Agreements and the Congestion Reduction Demonstration Program

In May 2006, the DOT announced the National Strategy to Reduce Congestion on America's Transportation Network, also known as the "Congestion Initiative." The intent of the initiative was to demonstrate a variety of innovative but proven strategies that could provide relief to traffic gridlock if more widely practiced. The UPA/CRD programs resulting from the Congestion Initiative were designed to encourage more aggressive, broad-scale pricing approaches. In each program, multiple sites around the U.S. were awarded funding for implementation of congestion reduction strategies. In total for these two competitive programs, over three-quarters of a billion dollars in grants were awarded to six cities: Miami, Minneapolis/St. Paul, San Francisco, Seattle, Atlanta, and Los Angeles. (Although New York City was initially awarded a UPA grant, the city was unable to meet the terms of their agreement and therefore exited the program.)

The UPA and CRD programs focus on using four complementary and synergistic strategies to relieve urban congestion: tolling, transit, telecommuting, and technology. For example, the Minnesota I-35 West project combined congestion pricing and active travel demand management to implement priced dynamic shoulders<sup>14</sup>. As a result, the UPA/CRD programs represent successful collaboration between offices of several DOT agencies, including the FHWA Office of Operations, Federal Transit Administration (FTA), and The Research and Innovative Technology Administration (RITA) Intelligent Transportation Systems Joint Program Office (ITS JPO). These are multimodal programs for which FHWA and FTA have taken the lead. The RITA is responsible for the national evaluation that is assessing the impacts of the UPA/CRD projects in a comprehensive and systematic manner across all sites.

### SOME UPA/CRD HIGHLIGHTS

- The Seattle project implemented performance-based pricing on all lanes of a highway facility (SR-520), a ground-breaking first in the country.
- San Francisco implemented an innovative variably priced parking program that has become the focal point of public parking agencies throughout the U.S.
- Atlanta's I-85 Express Lanes project has converted an existing HOV 2+ facility that was heavily congested in the peaks to HOT 3+, providing a reliable trip for drivers and extensive new transit service in the corridor.

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<sup>14</sup> Priced dynamic shoulders on I-35 west allow transit and carpools use the shoulder for free and MnPASS customers can use the shoulder for a fee. The left shoulder is open to traffic, with overhead sign gantries indicating its operational status. When the general purpose lanes become congested, the shoulder is opened and the speed limit on the general purpose lanes is reduced.

## Summary of UPA/CRD Strategies by Site

### *Variable Parking Pricing in San Francisco*

This project was officially deployed in April 2011. Unlike its UPA/CRD peers, the San Francisco SFpark project focuses on managing on- and off-street parking in the city. It comprises two key components: providing better, real-time parking information (such as through applications on smart phones, as shown in Figure 6) and



**Figure 6. SFpark Mobile Application (Source: Jay Primus, San Francisco Municipal Transportation Agency)**

implementing demand-responsive pricing. In the project's eight pilot areas, parking sensors and meters with a credit card payment option were installed for 7,000 spaces. Meter pricing varies by time of day (3 hour increments) and by block. To date (April 2012), rates have been changed five times for on-street meters; they can go up or down by 25 cents an hour, down by 50 cents an hour if a block is particularly empty, or remain unchanged. Rates have gone up in approximately one third of locations, down in one third, and have remained the same in one third.

An initial revenue evaluation of SFpark showed that more parking revenue is coming from meter payments rather than ticket payments in the pilot areas. This may suggest that the new credit card option has made payment easier, so customers are more likely to pay and avoid a parking citation. In addition, although increased revenue is not the primary goal of the project, the new meters are generating approximately 11 percent more net revenue than meters that were not upgraded.

In 2011, San Francisco Metropolitan Transportation Coalition (MTC) began to require their employees to pay for parking in order to send a message of "equal standards" to the public. In April 2011, they launched a formal and extensive marketing campaign centered on an identifiable SFpark brand to convey the message that availability of parking, and not turnover rate at parking spaces, is the primary goal of the project. The extensive effort put into this campaign may have contributed to the fact that over the course of five rate changes, San Francisco MTC has received zero complaints. In 2012, a pay-by-phone service will be

*"San Francisco is proud to be the first city*

*in the world to bring together demand-responsive pricing and real-time information about where parking is available to help reduce circling, double parking, and congestion."*

—Ed Reiskin

Director of Transportation, San Francisco Municipal Transportation Agency (SFMTA)

implemented, intensive monitoring and evaluation of the project will take place, and a proposal will be developed for expanding *SFpark* citywide.

An April 18, 2012, editorial in the San Francisco Examiner gives clear approval of *SFpark*, stating, “This demand-based pricing appears to be working. For instance, the agency recently announced that the average price at city-owned parking garages has dropped 95 cents since the *SFpark* rate changes began. For example, drivers can currently park all day at the Marina parking garage on Lombard Street for \$2 an hour or less, according to the transit agency. The hourly rate for other city-owned garages is higher, but this is a pricing model that makes sense — charging more for things that are in demand, and less for those that are not.”

### ***Full Facility Tolling on SR 520 in Seattle***

This UPA/CRD project is unique in that it comprises full road tolling, which began December 29, 2011, on the existing four-lane SR 520 Bridge crossing Lake Washington. The facility is tolled by time of day, and toll revenue will fund the replacement of the SR 520 Floating Bridge. The project also includes electronic travel time signs on I-405, SR 520, and SR 522 directing drivers to the best route across Lake Washington, a “Smarter Highways” program on SR 520 and I-90 that providing drivers with variable speed limits and real-time driver information, and more than 130 daily bus trips across the SR 520 Bridge.

Although the facility opened for tolling only recently, there was a 35-40 percent overall decrease in traffic volume on SR 520 across 2 weeks of data and a 5-10 percent increase in volume on I-90 and SR 522<sup>15</sup>, suggesting that, as the project intends, drivers are shifting their travel patterns onto alternate routes due to the toll. Similarly, during peak hours, traffic volume tends to increase approximately 15 minutes prior to increases in toll price, then drops off, again indicating that drivers are making travel decisions based on the tolls.

Although data has not been collected on changes in transit ridership, King County and Puget Sound Transit have estimated that ridership has increased 12-15 percent. Given that there was already an initial spike in ridership when the new bus service started in fall of 2010, this estimate suggests that another significant increase in transit use has occurred with the onset of tolling. More formal monitoring and evaluation of the SR 520 tolling, as well as its influence on future tolling in the region, will occur in 2012.

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<sup>15</sup> *Urban Partnership Agreement/Congestion Reduction Demonstration Peer Exchange Session*, TRB Annual Meeting 2012, January 26, 2012.



## *Express Lanes on I-85 in Atlanta*

For this UPA/CRD project, an existing 16-mile stretch HOV2+ lanes on I-85, one in each direction, was converted to HOV3+ express lanes. The lanes operate 24/7, and carpools with three or more riders, buses, emergency vehicles, motorcycles, and vehicles with alternative-fuel vehicles license plates can use the lane for free, while single occupant drivers and two person carpools pay a dynamically priced toll, which began on September 30, 2011. Since opening, the number of trips per day on the express lanes has increased from 3,200 to 12,000, and the number of registered “Peach Pass” transponders for using the express lanes has increased from 75,000 to 127,000.

Like the other UPA/CRD express lanes projects, the Atlanta project has a transit component, bringing online 36 new Xpress commuter coach buses and 2,200 new spaces in park-and-ride lots along I-85, as well as 45 new commuter coach buses and 5,000 spaces in park-and-ride lots in the remainder of the region. Transit ridership increased 7 percent only a month after tolling began. Because the I-85 express facility opened relatively recently, ongoing monitoring and evaluation of the project will occur throughout 2012. Because of this monitoring effort, initial public acceptance problems with the project were overcome through adjustments to the pricing levels and the public notification process related to when the various pricing levels will occur.

*“Priced managed lane methodology has been adopted by Georgia DOT Board leadership as the primary mechanism to address congestion on the metro Atlanta interstate system. The UPA/CRD grant has provided a broad partnership in the metropolitan area to foster positive congestion management options.”*

**- Darryl D. VanMeter,  
P.E., GDOT State  
Innovative Program  
Delivery Engineer**

## ***Express Lanes on I-35W in Minneapolis/ St. Paul, MN***

Building on the success of the MnPASS lanes already implemented on I-394 (previously funded under the VPPP), MnDOT pursued a UPA/CRD project to add MnPASS facilities to I-35W as well. The existing HOV lanes on I-35W from Burnsville Parkway to I-494 were extended, converted to express lanes, and opened to travelers with MnPASS transponders in September 2009. A 2-mile MnPASS extension south beyond the I-35E split opened in November 2010.

The dynamically priced HOT lanes are in operation from 6 a.m. to 10 a.m. in the northbound direction and from 2 p.m. to 7 p.m. in the southbound direction. Carpools with two or more people, vanpools, buses, and motorcycles continue to use the lanes for free. The MnDOT has the distinction of being the first agency in the country to operate a priced dynamic shoulder lane (PDSL). The PDSL opened to travelers on September 28, 2009, and operates northbound on I-35W from 46th Street to downtown Minneapolis from 6 a.m. to 10 a.m. and from 2 p.m. to 7 p.m. The lane is open to the same user groups as the HOT lanes. The PDSL reverts to a shoulder at other times.

About 3,000 customers per day use the I-35W MnPASS facilities, shown in Figure 7, generating approximately \$100,000 per month in revenue. Enforcement has been a success story of the I-35W project: while the violation rate on the existing HOV lane was 40 percent, it has dropped to under 8 percent. The primary selling point for MnPASS is reliability. During the morning peak period, a trip on the general purposed lanes on I-35W northbound can easily take 6-8 minutes longer than a trip in the MnPASS lanes; however, because the variability of travel time in the general purpose lanes is so much greater, the trip time could differ by 20-25 minutes.

In addition, the urban partners initiated several transit-related improvements, including the addition of 27 new express buses on the Marq2 bus route, which features side-by-side bus-only lanes for faster trips through downtown, and traveler information technologies such as electronic messaging for bus arrival and park-and-ride space availability. A lane guidance system for shoulder-running buses was deployed on Cedar Avenue. The system includes lateral-guidance assistance, collision avoidance, and automatic vehicle location system technologies. There has

*“Minnesota has benefited greatly from the VPPP. The program provided important resources to conduct project planning and outreach that was critical to winning public acceptance. Successful implementation of the first project directly led to successful implementation of value pricing in our UPA project.”*

— Ken Buckeye,  
Minnesota DOT



**Figure 7. Express Lanes on I-35 W (Source: Minnesota DOT)**

been an 18 percent increase in ridership on the Marq2, and bus operating speeds have increased, resulting in 5-10 minutes in time savings. In addition, a total of 1,484 new parking spaces were added at four park-and-ride facilities, which are currently at 45 percent capacity and growing.

A unique aspect of this UPA/CRD project is eWorkPlace, a teleworking program that encourages employers to offer their employees the option of working remotely. Over 4,000 employees and 48 employees have signed up, saving 5,000 peak trips on I-35 and I-394 each week and an average of 55 minutes of time per teleworker, per week. Due to the success and popularity of eWorkPlace, the brand and services will be continued through Transportation Management Organization partnerships.

### ***Express Lanes on I-95 in Miami***

This Miami UPA/CRD project, also known as the “95 Express,” uses a phased approach to convert a single HOV lane in each direction into dual express lanes on 21 miles of I-95 from Fort Lauderdale to downtown Miami. The project developed out of the “Proposed I-95 Managed Lanes Comprehensive Traffic and Revenue Study,” a feasibility and investment-grade traffic and revenue study funded through the VPPP and conducted for Florida DOT (FDOT) from



**Figure 8. 95 Express Bus (Source: Florida DOT)**

2005-2006. Based on this study, FDOT worked with transit partners to develop a plan to reduce congestion and provide more travel options in Miami-Dade and Broward Counties, which in turn evolved into the I-95 Express Lanes project. The project is being implemented under two construction contracts in three phases. Under Phase 1A, the northbound direction of the southern segment of the HOT lane project (from downtown Miami to Golden Glades) opened to traffic in early December 2008. Under Phase 1B, the southbound direction of the same segment was opened to traffic in early January 2010. Under Phase 2, the northern segment from Golden Glades to I-595 will be constructed. It is scheduled to open to traffic in 2012. The toll can range from \$0.25 during off-peak times when the facility is not subjected to high demand to \$7.10 in cases of severe congestion, but in FY 2011 the average peak period toll was \$1.70 in the southbound express lanes and \$2.25 in the northbound express lanes. The 95 Express project combines tolling, transit, technology, and telecommuting components together to effectively reduce congestion and improve the reliability of travel on I-95, particularly during the weekday rush-hour periods.

Early reports indicate that, since its opening, the 95 Express facility has had a dramatic, positive effect on travel in South Florida. During the morning peak period, average speed in the southbound express lanes has increased to 62 mph from 20 mph before the project opened, and during the evening peak, average speed in the northbound express lanes has increased to 56 mph from 18 mph before the project opened. In addition, the average peak period speed in the general purpose lanes has more than tripled southbound and more than doubled northbound. The reliability of the facility has increased as well; the speed is above 45 mph 100 percent of the time in the southbound express lanes and 92 percent of the time in the northbound express lanes. As of February 2012, the I-95 Express lanes were generating \$1.3 million per month, which is 115 percent of the projected amount.<sup>16</sup>

The 95 Express facility has had a dramatic positive effect on travel in South Florida. Southbound average peak speeds have increased from 20 mph to 62 mph.

The scope of the 95 Express project extends beyond the conversion of HOV to express lanes. It also includes improved ITS monitoring and incident management capabilities, ramp metering, and bottleneck elimination. There is a significant transit component to the project as well: 23 new express buses have been added, and three new BRT routes were added in January 2010. Since February 2008, the average number of peak period transit riders has increased from 1,800 to 4,600, and is continuing to grow. Lastly, the project team has conducted outreach for express lane users to register for 3+ carpools, and over 2,200 carpools have registered as of February 2012. The project also won the Intelligent Transportation Society of America Award for Best Innovative Practices in Marketing and Outreach in 2011.

### ***Express Lanes on I-10 and I-110 in Los Angeles***

This project will convert 25 miles of existing HOV lanes to express lanes on two heavy traffic corridors in Los Angeles. Construction began in July 2011, and the express lanes are scheduled to open on I-110 in fall 2012 and on I-10 in 2013. Express lane users will have a switchable FasTrak transponder to set their vehicle occupancy before starting their trip, and tolls will range from 25 cents per mile to \$1.40 per mile based on traffic demand.

Transit service on the I-10 and I-110 corridors will be expanded as well. In June 2011, the enhanced Silver Line Bus Rapid Transit service on I-110 was launched, and ridership increased 39 percent by February 2012. In addition, a transit and carpool/vanpool loyalty program was

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<sup>16</sup> Presentation given by Rory Santana, FDOT, at the December 15, 2011 FHWA-sponsored Webinar on Update of the Urban Partnership and Congestion Reduction Demonstration Programs, [http://www.fhwa.dot.gov/ipd/revenue/road\\_pricing/resources/webinars/congestion\\_pricing\\_2011.htm](http://www.fhwa.dot.gov/ipd/revenue/road_pricing/resources/webinars/congestion_pricing_2011.htm).

implemented in December 2011 that offers rewards to frequent transit riders on the express lanes and to registered carpools/vanpools.

## **UPA/CRD Lessons Learned**

The UPA and CRD programs have provided valuable lessons learned in the areas of communications and outreach, back office and technology integration, and equity.

### ***Communications and Outreach***

All of the UPA/CRD sites have learned the important role effective communication plays in successful project planning, construction, and implementation whether in the form of communication with the media, the public, politicians, or other transportation agencies.

Due to effective community outreach, SFpark has received zero complaints over the course of three rate changes.

In **San Francisco**, the SF *park* team engaged the communities where the pilot would take place before it was implemented so that they were familiar with and prepared for the project before it started. They also conducted an intensive outreach campaign with a very visible, recognizable SF*park* brand and image.

The **Los Angeles** project team tempered negative responses regarding the project by offering carpool/vanpool and transit reward programs that incentivize drivers to use these modes of transportation. The FTA distinguished the project team's public outreach plan as a model for other agencies.

In **Seattle**, the project team partnered with the media from the early phases of the project to help the media write the story to the public, explaining that it would take several months for driver behaviors to adjust and that data would be collected and made publicly available. Because of these early actions, the media was more restrained when the project opened and did not jump to premature conclusions about whether or not the project was a success. +

The **Atlanta** project team discovered the value of a good relationship with the media after the project was implemented. They recognized that traffic reporters have an effect on the use of the I-85 express lanes. If a reporter tells drivers that the price of the lanes is worth the estimated travel time savings on a particular day, traffic in the lanes will increase. Thus, the project team found it valuable to establish a relationship of trust with local traffic reporters by explaining the logic behind the changing rates.

When faced with political resistance to the MnPASS concept, the **Minneapolis/St. Paul** UPA/CRD project team learned the importance of communicating not only with the general public, but with politicians. By presenting data and a coherent, persuasive argument to the elected official who wanted to end the MnPASS program, the project team was able to shift his opinion, and the team is now better prepared to interact with all levels of the public.

The last communicative relationship the UPA/CRD sites have come to value is the one they have with their peers. For example, the **Atlanta and Los Angeles** project teams have engaged in peer exchanges so that Los Angeles can learn from the successes and pitfalls experienced in Atlanta. The **Miami** project team has been able to pass their ideas and experiences onto other transportation agencies within their own State, and the success of the UPA/CRD project there has prompted initial plans to determine if a similar express lanes concept could be expanded throughout southern Florida.

### ***Back Office and Technology Integration***

Several of the UPA/CRD projects involved significant technological and administrative undertakings for the implementing agencies. The Atlanta project team learned the true extent of hands-on, everyday oversight necessary to manage express lanes. They realized that having a tolling operations center in place to monitor toll rates and incidents is an extremely important component of an express lanes facility. Despite the complexity of the project and the effort required, the team discovered that the cost-benefits of converting lanes rather than building new roadways far outweighs any administrative challenges.

Similarly, the San Francisco project team discovered that *SFpark* is essentially a complex IT undertaking. As such, it has required restructuring San Francisco MTC business processes, but it has become a better organized and better equipped organization because of it.

### ***Equity***

The six UPA/CRD projects have encountered different public responses related to equity. For most, it has not come up as a significant issue. The Miami project team points to the fact that speeds on the I-95 facility have increased dramatically both in the express lanes and the general purpose lanes, proving that congestion pricing benefits all drivers on I-95, both those who choose to pay and those who do not. However, in Los Angeles, social equity was a major challenge. In response, the project team developed innovative outreach strategies, such as transponder discounts for low-income users and transit and carpool/vanpool loyalty programs, so that low-income users do not feel like they are at a disadvantage. In addition, by expanding travel options, the UPA/CRD projects provide system equity. Travelers can weigh the costs and benefits of multiple transportation modes and can choose the method that works best for them on a particular day, at a particular time.

In Miami, speeds on the I-95 facility have increased dramatically both in the express lanes and the general purpose lanes, proving that congestion pricing benefits all drivers, both those who choose to pay and those who do not.

## Progression Beyond VPPP and UPA/CRD: How the VPPP Has Helped Advance Congestion Pricing in the United States

During the past 3 years, there has been a clear trend among VPPP project partners in progressing from their original pricing projects to much more aggressive pricing projects and programs. In some cases, States made it clear from the outset of their grant projects that the initial project to be implemented (the majority of which have been HOV to HOT conversions) was a “pilot” and could be discontinued if not successful or acceptable. In other cases, the lead project represented the most practical opportunity to introduce variable pricing to the region.

One of the most encouraging developments in the past 3 years in congestion pricing has been significant “intermediate” steps toward full-scale system pricing. Several metropolitan areas have established very aggressive system-wide pricing and comprehensive managed lane systems in their long range plans. Some of these systems are variants of HOT lane networks while others are express toll lane systems, but all involve variable tolling of 250 to 800 lane-miles of specific lanes on these facilities.

The Metropolitan Washington Council of Governments (MWCOC) has been actively involved in the Washington, DC region’s history with congestion pricing, which includes HOT lane strategies as well as toll lanes and has commenced work on a recent grant for the public acceptability study. They have found that the region needs to look at “bundles” of strategies – pricing needs to be combined with other benefits to drivers to deliver a “value proposition” – e.g., not congestion reduction, but greater reliability and better quality of life.

### Managed Lane System Plans

The MTC approved a very extensive Express Lane Network originally in 2009. Recent revisions in the plan would incorporate 280 lane-miles of existing HOV lanes, converted to HOT lanes, with 290 lane-miles of new HOT lanes added to key existing freeways and bridges in the San Francisco Bay region.<sup>17</sup> This system would provide a congestion-free trip to virtually any part of the region for those willing to pay and would provide a huge time-savings incentive to use transit or carpooling. Transportation modeling shows that this system approach, if properly designed, would yield much greater benefits than the sum of benefits of individual HOV or HOT segments

*“The FHWA VPPP program, planning grants, and UPA grants have been enormously valuable in advancing congestion pricing projects in the Washington D.C. region.”*

- Ron Kirby, Director,  
Department of  
Transportation  
Planning, MWCOC

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<sup>17</sup> Metropolitan Transportation Commission, “Express Lane Expansion Proposal Moves Forward,” October 27, 2011, [http://www.mtc.ca.gov/news/current\\_topics/9-11/express\\_lanes.htm](http://www.mtc.ca.gov/news/current_topics/9-11/express_lanes.htm).

due to time savings available for the whole trip. A few segments of this system are already in operation with many more in the planning and design stages. These HOT lanes, as well as the existing HOV lanes are operated by multiple local transportation agencies on State and Interstate highways. The Alameda County Transportation Authority has operated the I-680 Smart Carpool lanes for a few years and the Santa Clara Valley Transportation Authority recently opened the 237/880 HOT Connector. Tolling policy and operations are handled by an arm of the MTC while Caltrans has authority over most of the roadways involved.

Incorporating all of these individual segments into a cohesive system will be no easy task. They operate under a variety of policies and conditions that would all need to be at least compatible, if not fully uniform. For instance, some of the facilities are already heavily congested in the peak periods, allowing two person carpools while others are underutilized at all times. They have operating hours that vary from 24/7 to any combination of times and peak direction usage, all to best meet the needs of local traffic conditions. In order to maximize the benefits of the system, the experience for the driver would need to be a “seamless” trip where the operating rules are compatible and easily understood from one segment to the next.

The recently established High Performance Transportation Enterprise (Colorado DOT’s tolling arm) is following a similar path toward an express toll lane system. Its original I-25 HOT lane conversion has successfully introduced the congestion pricing concept to the region and is the basis for two upcoming projects that will connect to that project at its north end. Several other segments throughout the Denver region have been studied for feasibility as HOT lanes and are part of the long-range vision as parts of that system.

The Georgia DOT (GDOT) and its tolling partner State Road and Tollway Authority opened the I-85 Express Lanes in 2011 as part of FHWA’s CRD program (see page 28 for details). This converted HOV lane segment is envisioned to be the first of an extensive system. The GDOT’s Managed Lanes System Plan is adopted in the region’s long-range transportation plan. Dallas/Fort Worth, Washington, DC, Minneapolis/St. Paul, Seattle, Denver, Miami, Charlotte, and Los Angeles are among several other metropolitan regions nationwide that are taking the managed lane system approach in order to ensure sustainable and reliable travel times far into the future.

*“VPPP grant funding as well as the technical support from the team were essential in the implementation of the I-25 HOT lane conversion project. The funding helped elevate the project to get the attention of local and state decisionmakers and the technology transfer efforts provided by the VPPP team allowed us to learn from successes and failures of previous projects. The High Performance Transportation Enterprise has an extensive program to expand variable tolling in Colorado, building upon successes of that original project. “*

*– Myron Swisher,  
former Colorado DOT  
Project Manager*



## ***System-wide Pricing – Seattle Region***

The PSRC adopted the *Transportation 2040 Plan* in May 2010, which states that all roadways in the regions will be priced by 2040. The General Assembly voted (98 percent in favor) for some system of charging for use of all existing highways (tolled and non-tolled) in order to finance their transportation program. This groundbreaking, politically bold, formally adopted regional policy did not occur simply as a result of reading reports of programs implemented in Europe and Asia.

The Seattle region has been a leader in cutting edge congestion management strategies over the past 2 decades, including congestion pricing. The WSDOT and its partner transportation agencies have received grant funding for several VPPP projects and studies since the late 1990s. The SR 167 HOT lane conversion project, which opened in 2008, served successfully as an “entry-level” congestion pricing project for the region to experience first-hand. That project, coupled with VPPP planning studies on various aspects of congestion pricing, have laid the groundwork for much more aggressive projects that are in the planning or design stages or are in the early implementation period. The I-405 HOT lanes plan will construct a major element of the region’s managed lane network.

The SR 520 project (under the UPA program) started tolling the existing facility for the purpose of managing traffic and raising revenue for the replacement bridge. This project employs variable pricing and represents the first facility in the nation to assess a toll on a previously toll-free facility. This is a major step forward in the U.S. for aggressive congestion pricing strategies that have a significant impact on urban traffic congestion. It represents the culmination of a decade-long program to study and experiment with “entry level” congestion pricing strategies, slowly building toward transformation of the entire transportation system. The rest of the Nation is taking notice of these successes in the Puget Sound Region, which is the objective of pilot programs such as VPPP.

## **Second Generation Variable Tolling Projects**

Another major progression has involved second generation variable tolling projects. Regions that have implemented relatively simple HOT lane conversion projects over the past decade or so have found them to be so successful that they have expanded the concept to take advantage of a strong synergy between road pricing and transit.

The SANDAG opened its first HOT lane conversion project on I-15 in 1996, using grant funding and support from the VPPP. It proved to be a fertile testing ground for many congestion pricing concepts as well as a live “laboratory” to observe traveler behavior in response to variable pricing. Many other States and regions, then in the concept development and planning stages, were observing very closely to see how the public would respond to hot button issues facing the fledgling industry, such as privacy, equity, preserving transit travel speeds, and technology. The

success of that simple HOT lane conversion project was instrumental in the expansion and extension of the concept to implementation of a major BRT corridor. The region found, through experimentation with the original I-15 HOT lane, that there was great potential synergy between congestion pricing and BRT to provide the most effective and efficient major transit improvement for that corridor. The SANDAG has a major managed lane network defined in its long-range plan and is underway on design and planning on key corridors.

In 1984, the HOV lane on the I-10 Katy Freeway first opened to vans and buses only. In 1986, the lane opened to carpools of two or more people. In 1998, due to congestion, the HOV occupancy was raised to three or more people during peak hours. At this time, a program called Quick Ride was implemented that allowed two person carpools to continue to use the lane during peak periods for a \$2.00 toll. Although this HOT lane moved at free flow speed, traffic continued to increase in the general lanes. The freeway was then expanded to eight general-purpose lanes, four in each direction, with continuous three-lane frontage roads in each direction. Additionally, in the center of the facility from I-610 west to State Highway 6, four HOT lanes operate, two in each direction, and from State Highway 6 to the Grand Parkway, two HOT lanes operate, one in each direction. The I-10 managed lanes project was a partnership of Harris County Toll Road Authority, Texas DOT, and Harris County Metropolitan Transit Authority. The Katy Freeway HOT Lanes project did not receive Value Pricing funds; however, the project obtained the authority to toll through the Value Pricing Program in 2002. Tolling operations began on the Managed Lanes on April 18, 2009.

### ***LBJ Express Project on I-35E and I-635 in Dallas, Texas***

The LBJ express project represents a culmination of over 2 decades of studies. It developed out of the LBJ Corridor study, which began in 1987. A major investment study of the corridor was completed in 1996, which established a locally preferred alternative (LPA) construction solutions to meet four goals in the corridor: enhanced mobility and safety; flexible response to changing traffic patterns; improvements to the community; and cost-effectiveness. The LPA received full local and regional consensus support and was adopted into the NCTCOG Regional Transportation Plan, Mobility 2020.

In addition, NCTCOG, in partnership with Dallas Area Rapid Transit, Texas DOT, and regional transportation partners, conducted a review of value pricing concepts for the Dallas/Fort Worth Region culminating the 2005 Regional Value Pricing Corridor Evaluation and Feasibility Study. This study identified candidates for short- and long-

*“Texas has benefited greatly from the VPPP and related programs. Not all have operational priced projects but all have permission to go forward. Permission to toll on the interstate system is more important than money provided by the programs.”*

— Matthew  
MacGregor, Texas  
DOT

term value pricing demonstration projects, including potential managed facilities. The results of this study were incorporated into the ongoing LBJ Corridor Study and contributed to its eventual approval and planning recommendations.

The LPA laid the groundwork for the current LBJ Express Project, construction on which began in January 2011. The project will nearly double the capacity on the LBJ Freeway while providing commuters with more travel options. Under this project, 17 miles of eight existing general purpose lanes on I-35E and I-635 will be reconstructed. In addition, 13 miles of new express toll lanes will be added to the route, two lanes each direction on I-35E, and up to three lanes in each direction on I-635. The express lanes on I-635 will be sub-surface lanes. The express lanes will maintain a guaranteed speed of 50 mph. In addition, two- and three-lane continuous frontage will be added for better access to the roadway.

## **Moving Forward: Advancing Congestion Pricing Over the Next 3 to 5 Years**

Congestion Pricing in the U.S. is at a “tipping point” whereby the successes of many of the initial HOT lane conversion (and other partial pricing) projects have led directly to much more comprehensive pricing programs. Although the VPPP has already helped advance congestion pricing to date, the next 3 to 5 years will be a critical period for the FHWA to continue its work to promote and support these projects. These early adoption projects have also led to the inclusion of pricing programs and the use of pricing as a long-term strategy in some regional transportation plans, particularly in large metropolitan areas. The numerous studies that have supported these early projects have continuing value as regions take on tolled express lane networks, pricing of previously non-tolled facilities, areawide pricing, and distance-based pricing approaches to dealing with congestion. These studies, made possible by VPPP funding, have examined the issues of equity and public acceptability in support of several HOT lane conversion projects. Results of those studies are directly applicable to these more aggressive pricing programs.

The industry is on the verge of a major shift to comprehensive pricing programs, one metropolitan area at a time, which will have a significant impact on traffic congestion relief, economic growth, and sustainable transportation for our largest cities, along with the potential for generating much-needed revenues. The support of the FHWA is essential to that expansion of pricing programs, not only through grant funding, but also by providing expert staff support, technology transfer, technical assistance with evaluation and implementation, outreach to industry partners, and interstate tolling authority.

The FHWA has been evaluating the role of congestion pricing in supporting funding and regional goals and has been actively involved in a variety of outreach activities, including workshops, peer exchange activities, and the preparation of primers and white papers designed to advance the future of congestion pricing at the State, regional and local levels. In September 2011, FHWA sponsored a series of four workshops on the application of congestion pricing strategies to meet regional goals for MPO, State DOTs, transit agencies, and other interested participants. Workshop participants identified the following crucial issues in advancing congestion pricing at the regional level:

### **Crucial Issues in Advancing Congestion Pricing at the Regional Level**

- Building Public and Decisionmaker Acceptability
- Linking Congestion Pricing to Regional Goals and Objectives
- Achieving Interagency Collaboration
- Analyzing Congestion Pricing as Part of the Planning Process
- Addressing Implementation Challenges and Sustaining User Support

- **Building Public and Decisionmaker Acceptability:** Although existing programs show that equity concerns have been largely addressed, these concerns do arise time and again in any new location where congestion pricing is proposed. To build acceptability, it is important to address concerns about equity and fairness, revenue use, credibility of the agencies involved in implementation, privacy, and user perceptions about being charged to use roads already paid for through fuel taxes. Ensuring an early, ongoing, and broad engagement process involving planners, decisionmakers, stakeholders, and the public, while communicating the role of congestion pricing in solving severe regional problems is crucial. Including congestion pricing in a bundle of complementary strategies acceptable to a range of stakeholders, showing data from existing projects and modeling studies, and implementing a short-term pilot program to prove the effectiveness of the strategy are other effective measures to build acceptability. Finding allies among decisionmakers and local leaders, and engaging experts and businesses also helps build broad-based support for a congestion pricing program.
- **Linking Congestion Pricing to Regional Goals and Objectives:** The objectives of the congestion pricing program must be clearly linked to regional planning goals such as environmental sustainability and economic development and this understanding must be communicated to the public and to decisionmakers. This helps planners in developing pricing programs as part of a comprehensive approach to achieving regional goals. When pricing programs are implemented, ongoing monitoring and evaluation must ensure that the program is achieving previously identified goals, objectives and system performance targets.
- **Achieving Interagency Collaboration:** It is important to reach an agreement between agencies and jurisdictions on how best to achieve regional goals and objectives, how to allocate the costs and revenues of a congestion pricing program, how to manage and operate the program, and how to work across cultural differences and silos between and within agencies. Early in the process, it is critical to establish regional partnerships that clearly identify regional roles and responsibilities, while drawing on the unique strengths of each agency. High level political leadership and support can also be important for achieving collaboration among agencies.
- **Analyzing Congestion Pricing Impacts as Part of the Planning Process:** Analyzing the full regional or project-level traffic, economic, and social impacts of a congestion pricing program requires significant technical capability and data. Potential changes in travel behavior are often difficult to predict. However, the use of improved travel demand models and other tools has helped many regions analyze these impacts in a robust way at different stages of planning. In addition, the use of data based on observed impacts and pilot projects, collection of new data where needed, the use of cost-benefit analysis and revenue estimation tools, as well as an early focus on

analyzing potential equity impacts have proved to be effective practices in several regions.

- **Addressing Implementation Challenges and Sustaining User Support:** Legislative barriers, such as the lack of authority to implement tolling on previously free facilities and limits on the use of revenues, have been a key challenge in many regions. Obtaining funding for pricing projects and limited user experience with the pricing concept and technology have also been common implementation challenges. Establishing a supportive policy framework for implementing regional pricing programs, involving the private sector, establishing conditions for revenue use, and managing how prices may be adjusted in the future have proved effective. In addition, ensuring that the user experience is seamless, creating opportunities for the public to test and become familiar with the technology, and developing ways to enforce occupancy requirements without burdening users are important for sustaining user support.

### **Addressing Emerging Trends: The FHWA Program Plan**

Over the next 3 to 5 years, FHWA will support current initiatives as well as advance new thinking to evolve the state of the practice on congestion pricing along five tracks of activity:

1. **Knowledge and Technology Transfer (KTT):** FHWA will take the lessons learned from the VPPP projects as well as evaluations of other congestion pricing projects (e.g., the UPA/CRD Programs) and put it into a format (e.g., brochures, fact sheets, Webinars, and workshops) that other States and metropolitan areas can use to advance their plans and programs. The FHWA is in the process of updating the existing Tolling and Pricing Web site at [http://www.ops.fhwa.dot.gov/tolling\\_pricing/index.htm](http://www.ops.fhwa.dot.gov/tolling_pricing/index.htm) in order to turn it into a “one-stop shop” for congestion pricing resources and information. The site will be reorganized around the various congestion pricing concepts and strategies, enabling those interested in learning more about congestion pricing to easily find needed information. The focal point of the site will be a Congestion Pricing knowledgebase, a fully searchable and browseable repository of congestion pricing-related resources. The knowledgebase will allow users to search by keyword or topic on thousands of congestion pricing documents from both U.S. and international projects. For example, if someone were looking for information on dynamic tolling in California, they will be able to search for documents that fit those criteria by selecting from drop down menus of browse categories. The knowledgebase was demonstrated at the 2012 TRB Annual meeting and received much positive feedback.
2. **Ongoing Project Monitoring:** As required by the VPPP statute, FHWA will continue to monitor the VPPP projects for 10 years to help assure successful and effective projects as

well as to identify the important results and impacts that are transferable to other States and metropolitan areas.

3. **Conduct Issues-Oriented Research:** As issues facing State and local agencies in the implementation of congestion pricing program emerge through project monitoring, national conference discussions, and/or stakeholder input, FHWA will sponsor research that can guide agencies on how to best address these challenges. Examples of such issues-oriented research that will be conducted include equity, reaching public acceptance, technology applications, public transit, analysis methods, enforcement, safety, and design. The FHWA will hold an additional congestion pricing workshop, similar to the four workshops held in September 2011, to better understand congestion pricing issues and strategies for overcoming these issues in order to continue to advance congestion pricing.
4. **Facilitating a Dialogue:** The FHWA will be working with State and local agencies, as well as national thought leaders and stakeholder groups, by facilitating discussions on current and innovative concepts and approaches to congestion pricing at national conferences (e.g., the TRB or ITS America), localized workshops, or specialty peer exchanges. In May 2012, FHWA will hold an Institutional Issues Peer Exchange to learn more about the institutional issues affecting congestion pricing implementation and how agencies are overcoming these issues. The outcome of the peer exchange will be used to develop a primer on institutional issues.
5. **Long-Term Research:** Working with stakeholder groups, e.g., TRB, FHWA will continue to support and help sustain a long-term program of research on congestion pricing through national programs such as the NCHRP and the Transit Cooperative Research Program.

The outcomes of these five program area tracks will include activities such as:

- Expansion of the scope and scale of pricing and non-toll pricing applications to include consideration, evaluation, and implementation of a range of pricing approaches – pricing street networks (as in area-wide pricing), freight movement, parking on and off street, existing and new corridors including shoulders, and pricing of highway and freeway networks within regions.
- More attention to and implementation of pricing aimed at multiple objectives important to regions and States, including traditional congestion relief, revenue generation, emissions reduction (e.g., emission fees), and increased efficiency of vehicle use, equity and safety (e.g., PAYDI).
- Increased use of pricing in new locations within the U.S., enabling further testing and evaluation of promising but less tried strategies, and increasing the deployment of pricing strategies proven to be most effective.

- Increased application of latest and best pricing, enforcement, operational, and information technologies and evaluations of their costs, reliability, direct and indirect effects, with comprehensive and widely disseminated lessons for further application.
- Improvements in analytic and regional modeling tools to estimate the impacts of pricing strategies in planning and implementation studies, supported by documentation and dissemination of such tools aimed at further adoption and application.
- The packaging of current VPPP grants with other program grants such as transit or the Transportation Investment Generating Economic Recovery grants, also known as TIGER grants, to encourage pricing in conjunction with other transportation strategies to promote sustainability, livability, and more effective and efficient use of transportation resources.

The above activities are expected to encourage improved understanding, evaluation and integration of a full array of toll and non-toll pricing strategies in State and local planning and decisionmaking processes. The information and resources needed to implement these activities are currently being provided by FHWA through a number of outreach efforts, meant to help advance emerging trends in congestion pricing.

## **Current and Planned Outreach Activities**

An important ongoing role for the FHWA in the next few years will be to provide support to regions and States in planning and implementing pricing projects through funding and technical guidance that enable regions and States to select the most appropriate programs to meet their goals. The expansion of congestion pricing across the U.S. depends heavily on the extent to which FHWA can educate States, MPOs, the public, and decisionmakers about congestion pricing and equip them with resources, information, and materials to help them develop and implement congestion pricing projects. The FHWA must continue to build awareness among these target audiences that congestion pricing is a viable solution for congestion management.

The FHWA Congestion Pricing team has been involved in several successful outreach efforts around the country related to toll and non-toll pricing strategies. Participation has been strong and feedback from participants has been quite favorable.

Between 2008 and 2009, FHWA developed several primers as part of the Congestion Pricing Primer series. The aim of the primer series was not to promote congestion pricing or to provide an exhaustive discussion of the various technical and institutional issues one might encounter when implementing a particular project; rather, the intent was to provide an overview of the key elements of congestion pricing, to illustrate the multidisciplinary aspects and skill sets required to analyze and implement congestion pricing, and to provide an entry point for practitioners and others interested in engaging in the congestion pricing dialogue. Since then, FHWA has moved from educating practitioners about what is congestion pricing, to providing them with lessons



learned, strategies for overcoming challenges, and successful practices found through existing projects.

In November 2010, FHWA conducted a stakeholder workshop, attended by members of various congestion pricing related TRB committees, to identify congestion pricing outreach and education needs. The majority of workshop participants indicated that updating the FHWA Tolling and Pricing Web site with relevant information and holding seminars, meetings, workshops, and Webinars would be most useful to sharing congestion pricing related information and knowledge.

### ***Congestion Pricing Workshops***

The FHWA held four 1-day peer-to-peer practitioner workshops on road pricing in September 2011 in Atlanta, Chicago, Denver, and Washington, DC. The objective of the workshops was to provide technical assistance to help transportation practitioners better understand approaches that integrate road pricing, land use, and multimodal investments to support regional goals, including livability. This includes information on what pricing approaches are most effective in different settings and in combination with different transportation investment strategies. Participants at the workshops included MPO planners, Federal and State DOT staff, as well as representatives from transit agencies, tolling authorities, and consultants.

The focus of the workshops was the role of congestion pricing in supporting funding and regional goals and how to integrate pricing in metropolitan transportation plans. The workshops included sessions on lessons learned from experience with congestion pricing and metropolitan planning, and included presentations and panel discussions by practitioners from different regions of the country that have implemented, planned, or conducted studies for congestion pricing programs. Through these sessions, workshop participants shared their perspectives and presenters provided insights from their experiences. This information is now being used to develop a Primer on Effective Approaches for Advancing Congestion Pricing in a Metropolitan Region.

“I want to express my appreciation for the webinar series on Congestion Pricing.”

– Philip Winters,  
Director, TDM  
Program, Center for  
Urban Transportation  
Research at the  
University of South  
Florida

### ***Webinar Series on Overcoming the Challenges of Congestion Pricing***

In March 2011, FHWA launched a monthly Webinar series entitled “Overcoming the Challenges of Congestion Pricing.” These Webinars are aimed at State and local agencies that are currently in the process of implementing or would like to implement congestion pricing; decisionmakers/political leaders who want to better understand the benefits of congestion pricing; MPOs that may be interested in incorporating pricing into their planning activities; and others who just want to learn more about congestion pricing strategies. The Webinars were held

on a monthly basis from March through December 2011 and are being held on a bimonthly basis in 2012; the first Webinar of 2012 was held in February. Topics covered have included:

- Congestion Pricing Projects in the San Francisco Bay Area: I-680 Express Lanes and Bay Bridge Time-of-Day Pricing
- Congestion Pricing Benefits, Challenges and Opportunities
- Institutional Issues in Congestion Pricing
- Congestion Pricing Equity Impacts
- Technology to Enable and Complement Congestion Pricing
- Dynamic Ridesharing and Congestion Pricing
- Pay-As-You-Drive Insurance
- Economics of Congestion Pricing and Impacts on Business
- Integrating Transit with Congestion Pricing and Increasing Congestion Pricing Acceptance
- Results of the Urban Partnership and Congestion Reduction Demonstration Programs
- Best Practices in Parking Pricing
- Public Acceptability of Congestion Pricing

Each Webinar typically includes three or four presenters who have firsthand experience with the topic and can share their challenges, successes, and lessons learned. Webinars have averaged over 150 participants and have been very well received.

The Hampton Roads MPO included on its blog a summary of findings from the December 2011 Webinar on Results of the UPA/CRD Programs, noting that, “Given that Hampton Roads has HOV lanes which may be candidates for being converted into HOT lanes, the “lessons learned” from the Webinar are summarized below.”<sup>18</sup>

### ***Parking Pricing Workshops***

In September 2011, FHWA (in conjunction with its partner – National Association of City Transportation Officials) held a 2-day workshop in San Francisco entitled, “State of the Practice: Parking Management and Pricing in the United States.” This workshop brought together over 70 city parking policy makers and managers from around the country to share lessons learned, best practices, and plans for the future. It provided the opportunity for these professionals to experience first-hand, the details of the groundbreaking *SFpark* project. There was a strong interest among participants to continue this as an annual event.

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<sup>18</sup> H RTP E-Newsletter, January 6, 2012, <http://www.hrtpo.org/crossings/post/e2809cCongestion-Pricing2809d-Webinar.aspx>

Experiences and information on a wide range of parking topics were exchanged, including:

- Parking payment technologies;
- Vehicle detection technologies;
- Managing parking exceptions and special considerations
- Disabled permits;
- Parking pricing;
- Data collection and system management strategies; and
- General parking management issues facing small, medium and large cities.

### ***Institutional Issues Peer Exchange***

A peer exchange on congestion pricing institutional issues was held in May 2012. The peer exchange workshop examined a variety of institutional challenges and opportunities related to implementing congestion pricing programs, such as:

- Leadership - project champions, roles and responsibilities
- Legislative - Enabling legislation, political issues
- Organization - Internal and External structures, interagency agreements
- Planning process-setting objectives, agency coordination, environmental review, social equity
- Public involvement - outreach strategies, gaining public support
- Managing Costs and Revenues - cost sharing, allocation of revenues
- Implementation - construction and roll-out, day-to-day operations (e.g., O&M, enforcement)

Participants in the peer exchange will include representatives from FHWA, State DOTs, MPOs, and other interested stakeholders. The one-day peer exchange will include short presentations and facilitated discussion. The presentations will highlight active congestion pricing projects and the institutional issues involved in planning and implementing the programs. After each group of presentations, the group will be led through a facilitated discussion to explore the issues in greater detail.

### ***Publications and Information Products***

The FHWA has developed numerous primers and research reports to help guide State and local agencies and decisionmakers in implementing congestion pricing strategies. These include the Congestion Pricing Primer series, which covers topics such as non-toll pricing, technologies that enable and complement congestion pricing, transit and congestion pricing, economics of congestion pricing, and income-based equity impacts of congestion pricing. The FHWA is

currently in the process of developing a primer on Active Parking Pricing and Management to provide information about cutting edge parking management and pricing policies and systems, especially the systems that use ITS and other advanced technologies that are being deployed by cities and large institutions. A primer on Congestion Pricing Institutional Issues is also in development, based on the outcomes of the Institutional Issues Peer Exchange.

### ***Benefits of Outreach Activities***

Through each of these outreach and knowledge and technology transfer activities, FHWA is addressing emerging congestion pricing trends and equipping target audiences to implement congestion pricing strategies. Without the VPPP and other FHWA tolling and pricing programs these outreach efforts would not be possible. It is the outcomes, lessons learned, and success stories that are found from the VPPP that are often shared through these activities. These real world examples are what enables target audiences to trust the information provided by FHWA and understand that congestion pricing strategies can be successfully implemented in all different types of regions.

## **Conclusion**

The VPPP has been an effective Federal transportation program and has been critical for States and regions in exploring and initiating pricing projects to successfully manage congestion on State and regional facilities. These projects have played a central role in introducing transportation professionals, political leaders and citizens to pricing as a tool to address congestion problems and to manage our transportation system more effectively. The VPPP (along with the UPA and CRD projects) has led FHWA to frame a congestion pricing program involving technical assistance, outreach, and research over the next 3 to 5 years with respect to both tolling and non-tolling programs and projects.

The FHWA will continue to fund pricing projects, both tolling and non-tolling, that are innovative and are either implementation projects or may lead to implementation. While the assumption among many may be that HOT lanes have been proven, there will be strategic investments in HOT lane projects that lead to innovative HOT networks, implement new technologies or are multimodal investments such as BRT or transitways using HOT lanes. Parking pricing and mileage-based pricing approaches will also be encouraged, particularly if they lay the groundwork or provide critical information for future system changes.

The next 3 to 5 years will be a critical period for the FHWA to continue its work to promote and support these projects. An integrated approach to managing congestion that includes pricing, transit, and technology will be important elements in the operations tool box. Moving forward, it is important that the FHWA's Office of Operations in coordination with the Office of Innovative

Program Delivery and other pricing activities in DOT as well as at other Federal Government agencies including the Environmental Protection Agency and Department of Energy further develop, advance, and enhance the tolling and pricing initiatives that have progressed thus far as part of the VPPP. Key next steps will be to promote, educate, and assist a variety of stakeholders in order to advance, monitor, and assess congestion pricing initiatives at the State and local levels.

## **Appendix A. Summary of Ongoing Congestion Pricing Activities and Related Research**

Efforts are underway to evaluate the impact of congestion pricing on travel behavior. In 2010, the Volpe Center embarked on a household panel study analyzing how and why users of an urban highway/transit corridor change their travel behavior in response to the application of congestion pricing strategies. This particular study will evaluate two UPA/CRD program sites (SR 520 and I-85 Express Lanes). Measures to be analyzed will include route choice, mode choice, and trip timing. The study will also explore changes in travelers' satisfaction with transportation services and their attitudes toward tolling, congestion and related issues. Similarly, outside of the VPPP, much research in the field has been conducted by implementing agencies, universities, and research organizations such as the TRB, the Institute of Transportation Engineers, the International Bridge, Tunnel and Turnpike Association, and so on.

Samples of some of these studies are described below:

### **Road Pricing Can Help Reduce Congestion, but Equity Concerns May Grow, U.S. Government Accountability Office, 2012**

In this recently published study<sup>19</sup>, the U.S. Government Accountability Office (GAO) examined (1) the Federal role in supporting congestion pricing, (2) results of U.S. congestion pricing projects, and (3) emerging issues in congestion pricing. The study is based on an evaluation of 14 congestion pricing projects as well as interviews with officials at the sponsoring agencies regarding the performance and impacts of their pricing projects.

The GAO found that the 14 congestion pricing projects that have current and complete evaluations generally show that pricing can help reduce congestion, although other results are mixed, and not all possible relevant impacts have been assessed as part of these evaluations. The HOT lane projects, which aim to reduce congestion by decreasing travel time and increasing speed and the number of vehicles using the lane, have reduced congestion, but some HOT lane projects also added new lanes, and studies did not distinguish the extent to which performance improvements were due to added lanes versus pricing. In addition, although the number of cars using HOT lanes has risen, there were fewer people in those cars because of an increase in the proportion of toll-paying solo drivers or a decrease in carpools.

Peak-period pricing projects, which aim to reduce congestion by encouraging drivers to travel at off-peak times, have shifted some travel to those times. Other congestion pricing effects—such as income equity impacts—have not always been evaluated. Income and geographic equity

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<sup>19</sup> *Road Pricing Can Help Reduce Congestion, but Equity Concerns May Grow*, U.S. Government Accountability Office, January 2012, <http://www.gao.gov/assets/590/587833.pdf>.

impacts are important to assess as they address the public and elected officials' concerns about the effects of pricing on travelers and communities. Ongoing multiyear evaluations across six metropolitan areas will assess the performance and effects of congestion pricing projects using a specific set of measures to assess the effectiveness of congestion reduction strategies.

### **National Evaluation Framework and Plans for the Urban Partnership Agreement and Congestion Reduction Demonstration Projects**

Based on a guidance document published by the FHWA Office of Operations in 2008 that established a National Evaluation Framework (NEF) for all six UPA/CRD sites, evaluation plans were developed for UPA/CRD programs in Los Angeles County, Miami, Minnesota, San Francisco, and Seattle. The reports provide an analytic framework for evaluating projects funded under UPA/CRD and provide valuable guidance to other regions seeking to conduct an evaluation of their pricing programs.

Four objective questions that were posed by the DOT serve as a starting point for the NEF and the evaluation plan at each site. These questions are:

- How much congestion was reduced;
- What contributed to the reduction and what were the associated impacts;
- What lessons were learned about non-technical factors for success; and
- What were the overall costs and benefits of the congestion reduction strategies.

The four objective questions were translated into several evaluation analyses, which in turn consist of hypotheses and questions, measures of effectiveness (MOE), and data required for the MOEs.

These documents can be a useful reference for practitioners in other regions where pricing programs are being planned or implemented. The NEF and evaluation reports for each of these projects can be found on this link: <http://www.upa.dot.gov/pub.htm>.

### **Synthesis of Congestion Pricing-Related Environmental Impact Analyses, FHWA Office of Operations, 2010**

This report summarizes the state-of-the-practice and presents a recommended framework for before-and-after evaluations of the environmental impacts of congestion pricing projects, such as HOT lanes and “cordon” or area pricing schemes. The report focuses on the three environmental impact areas that have been most commonly examined in such evaluations: air quality, noise, and environmental justice (sometimes referred to as equity). Since environmental impacts are a function of the travel impacts of congestion pricing projects, this report also examines state of the practice regarding evaluation of travel impacts such as traffic, transit and travel behavior.

The state of the practice results are based primarily on a review of the published literature associated with eight congestion pricing study projects from around the world. A number of

gaps in existing practice and understanding are identified and recommendations are provided to address those gaps.

### **Congestion Pricing – A Primer: Metropolitan Planning Organization Case Studies, FHWA Office of Operations, 2011**

Pricing programs have often come about separate from the traditional metropolitan planning process through pilot projects and demonstrations. Given that federally funded pricing demonstration projects have shown road pricing to be an effective tool, there is a growing need to incorporate road pricing into long-range plans.

This report summarizes the results of a study on how road pricing was incorporated into long-range planning by four MPOs, providing examples and guidance to support other regions seeking to do the same.

The four case study regions were selected by the FHWA based on a previous study, *A Domestic Scan of Congestion Pricing and Managed Lanes* and represent places where road pricing has been included in long-range plans successfully: the Dallas/Fort Worth region, the Puget Sound region, the Minneapolis/ St. Paul region, and the San Francisco Bay area. In each of these regions, the progression of road pricing through the planning process follows a unique path, based on each region's own distinctive history of attitudes toward pricing, jurisdictional relationships, and politics that influence how pricing is perceived.

### **Congestion Pricing Primer Series**

The Congestion Pricing Primer Series serves to introduce the various aspects of congestion pricing to decisionmakers and transportation professionals in the U.S. The primers are intended to lay out the underlying rationale for congestion pricing and some of the technical issues associated with its implementation in a manner that is accessible to non-specialists in the field.

Titles in the series include:

- Congestion Pricing Overview.
- Non-Toll Pricing.
- Technologies That Enable Congestion Pricing.
- Technologies That Complement Congestion Pricing.
- Transit and Congestion Pricing.
- Economics: Pricing, Demand, and Economic Efficiency.
- Income-Based Equity Impacts of Congestion Pricing.



### **Active Parking Pricing and Management Primer**

The FHWA is developing a primer on Active Parking Pricing and Management to provide information about cutting edge parking management and pricing policies and systems, especially the systems that use ITS and other advanced technologies that are being deployed by cities and large institutions. In addition to covering “how to” technical subjects, the primer will detail best practices for strategies, policy design and implementation and for approaches to conquer obstacles.

The primer will address public-acceptance, policy, and technical issues. It will also provide insights on the policy environment in leading cities and will answer the following questions for government controlled parking strategies that are considered best practices:

- What policy considerations are there in managing the municipality’s parking stock?
- How does parking utilization information affect price changes and what are the specific mechanisms to bring about such changes?
- What residential parking program innovations are being deployed?
- How is government as an employer setting an example, such as by charging its employees for parking, offering parking cash-out, or providing incentives for alternative-mode commuting?

Exemplary government policies to influence privately provided parking will be explored by answering these questions:

- What policies are being implemented to encourage better management and pricing of parking that is not government controlled (e.g., taxing parking that is not directly priced to the user, mandating parking-cash out, providing employer tax credits for alternative-mode commute benefits)?
- What is the relationship between how parking is handled within the zoning code and the city’s public policy and livability objectives vis a vis parking?

VPPP Projects Funded Since 2008				
FISCAL YEAR	FUNDING RECIPIENTS	STATE	PROJECT	AMOUNT
2008	San Francisco Bay Area	CA	SFPark Urban Partnership	\$10,000,000
2008	MNDOT	MN	MN Innovative Choices for Congestion Relief UPA	\$5,000,000
2008	WSDOT/King county/Puget Sound	WA	Seattle/Lake Washington corridor Tolling and Transit UPA	\$10,000,000
2009	Caltrans/Valley Transportation Authority	CA	Implement roadway pricing on SR 237 Express Connectors	\$3,200,000
2009	Twin Cities Area	MN	Feasibility study on pricing innovative lane additions on Trunk Highway 77	\$540,000
2009	Twin Cities Area	MN	Pre-implementation study of priced managed lane on I-94	\$400,000
2009	Greater Buffalo Niagra Regional Authority	NY	Pre-implementation of study of GPS-based truck pricing system	\$717,000
2009	Puget Sound/Seattle Area	WA	Express lanes system concept study	\$1,280,000
2010	Caltrans / Santa Clara County	CA	Strategies to manage traffic and parking.	\$2,358,000
2010	Caltrans / City of Berkeley	CA	Strategies to manage on-street parking and reduce congestion from circling vehicles.	\$1,800,000
2010	Caltrans / Santa Barbara County	CA	Testing of carpooling system that uses participation incentives.	\$158,400
2010	Florida DOT	FL	Initiative for a regional priced managed lane network that can serve as a model for other regions.	\$900,000
2010	Tampa-Hillsboro Expressway Authority	FL	Advancement of first regional network of bus toll lanes in the Tampa area.	\$800,000
2010	NCDOT and Charlotte MPO	NC	Advancement of first regional network of priced lanes in the Charlotte area.	\$400,000
2010	MnDOT	MN	Expansion of project to test incentive alternatives to monthly parking passes and discourage daily driving.	\$24,800
2010	Texas DOT	TX	Usage-based insurance pricing and additional incentives for efficient travel choices.	\$1,948,000
2010	Virginia DOT and Washington Council Of Governments	VA	Advancement of regional pricing in DC including pricing existing facilities.	\$320,000
2010	Washington DOT and King County	WA	Implementation of incentives as alternatives to parking.	\$1,024,000
2011	Caltrans/SCAG	CA	Express Travel Choices	\$1,080,000
2011	Caltrans/MTC	CA	Priced Electric-assist Bicycle Sharing in San Francisco	\$1,054,221
2011	Caltrans	CA	Parking Pricing and Regulations Study in San Francisco	\$480,000
2011	Connecticut DOT	CT	I-84 Viaduct, Hartford, CT	\$644,000
2011	Connecticut DOT	CT	I-95 Corridor Full Facility Pricing: New York to New Haven CT	\$1,120,000
2011	Florida DOT/Florida Transportation Enterprise	FL	Integrated Congestion Pricing Plan	\$600,000
2011	Illinois State Toll Highway Authority	IL	Integrate and Finance Transit w/ Priced Managed Lanes	\$528,840
2011	Massachusetts	MA	Pay-As-You-Drive Insurance in Massachusetts	\$2,144,000
2011	Oregon	OR	Peer-to-Peer Ridesharing in Portland, Oregon	\$1,725,000
2011	Texas	TX	Integrating Transit Related Pricing Incentives in Support of Managed Lanes	\$160,000
2011	Texas/NCTCOG	TX	Influencing Travel Behavior and Considering Environmental Justice	\$588,301
2011	Texas/CTRMA	TX	183A Turnpike Pilot Downstream Impacts	\$1,220,424
2011	Virginia	VA	Dynamic Ridesharing with Financial Incentives in Northern VA	\$447,200
2011	Washington	WA	Parking Pricing for Delivery trucks in Seattle	\$446,000