The Impacts of Congestion Pricing on Carpooling and Transit

- **Audio:**
  - Via Computer - No action needed
  - Via Telephone – Mute computer speakers, call 1-866-863-9293 passcode 36547547

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- **Audience Q&A** – addressed after each presentation, please type your questions into the chat area on the right side of the screen

- **Closed captioning is available at:**

- **Recordings and Materials from Previous Webinars:**
Managed Lanes and Alternative Modes - How Can They Peacefully Coexist?

Allen Greenberg
FHWA, Congestion Management and Pricing Team
Overview

- Why managed lanes are important
  - Case study: Miami
- Unique issues for casual carpooling with managed lanes
- Appropriate program goals
- What not to worry about
- Other commuter-related pricing
  - Employer programs
  - Parking and access pricing “gems”
Why managed lanes are important: the problem

- Because HOV lanes had excess vehicle carrying capacity (despite higher person throughput than GP lanes), drivers in GP lanes demanded less restrictive or open access to these lanes.
- Where HOV lanes remained, occupancy requirements were reduced, especially through the early 1990s prior to the popularization of HOT lanes.
- New capacity built on the promise that it would be for HOV became GP lanes.
Why managed lanes are important: the solution

- HOT lanes have for the first time led to increasing occupancy requirements for free HOV travel (albeit often with projects adding capacity).
- HOT lane projects, especially through the Urban Partnership Program, have been the backbone of enormously successful new and expanded express bus services (case study: Miami).
Miami I-95 Express Lanes
Miami I-95 Express Lanes

TOTAL RIDERSHIP MULs GGI to MIA
2009: 1,800 / peak period
2012: 5,498 / peak period
Transit can play a role in congestion pricing.
Unique issues for casual carpooling with managed lanes

- Describe casual carpooling
- Casual carpooling requires 3+ occupancy for enhanced safety (Houston HOT-2 exception)
- HOT-3 is likely to work with casual carpooling if tolls are high and not work if tolls are low
- Where HOT lanes are introduced, driver/rider numerical balance could be maintained by, with political support from casual carpoolers, moving from HOT-3 to HOT-4
Appropriate program goals

• Preserving a managed lane network that offers users fast and efficient travel
• Serve and foster express bus and casual carpooling systems
• Offer solo-drivers a premium travel option (used occasionally by drivers of all incomes) as a substitute for adding new GP lanes (can reward transit riders with credits toward free access)
What not to worry about

- Slight changes in vehicle occupancy or slower commutes for HOV-2 “fam-pools” that choose not to pay a HOT-3 toll (perhaps to enjoy more “in-vehicle quality family time”)
  
  - Focus should instead be on having a system that allows fast and efficient “high-value” trips (e.g., bus, commuter van, and perhaps other multi-occupant vehicle trips, plus SOV users paying a real premium)
Other commuter-related pricing

- Fairly pricing employee parking
- Parking pricing and access gems
Fairly pricing employee parking

- 95% of private-sector employees receive free parking v. 6% receiving transit benefits
- Equalizing parking and non-parking benefits through cash-out and transportation allowances works:
  - Eight-site Los Angeles study showed cash-out to cut drive-alone commutes from 76% to 63% of total
  - CH2M Hill in Bellevue, WA converted free parking to a travel allowance, cutting SOV commuting from 89% to 64%
- Cities without cash-out ordinances uniquely disadvantage their own citizens (e.g., 31% SOV mode share for DC residents v. 50+% for suburban residents traveling to DC worksites)
Parking and access pricing gems

- Minneapolis PayGo Flex-Pass led to 56.5% driving days v. 78.5% for traditional paid monthly parking
- After off-peak port-access discounts were introduced, 45% of trucks at the Los Angeles and Long Beach piers arrived during off-peak hours, versus only 17-21% prior to such discounts
- Parking pricing can include congestion pricing elements (e.g., SFpark $2 peak-shoulder garage entrance/exit discount)
Contact Information

Questions:

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Impact of HOV to HOT Conversions on Carpooling

White Paper prepared for FHWA Office of Operations, Transportation Management

Eric N. Schreffler
ESTC
Purpose of White Paper

- Preliminary assessment of impacts of HOT conversion on carpooling
- Does not focus on transit impacts; acknowledges primary objectives such as increased efficiency
- Cross-cutting investigation of UPA/CRD projects (Atlanta and Miami) and other projects, e.g., I-15 (San Diego) and I-394 (Minneapolis)
- Intended to assess findings from early projects and provide input to USDOT and others
- Builds upon recent work by Caltrans and TTI
- Desire to elicit discussion at this conference
Co-Authors

- Ginger Goodin, TTI
- Nick Wood, TTI
- Eric Schreffler, ESTC
- Carol Zimmerman, Battelle
Projects Investigated

- **UPA/CRD (completed)**
  - Miami
  - Minnesota
  - Atlanta
- **Newer UPA/CRD & Studies**
  - Seattle
  - Los Angeles
  - Dallas
- **Other Operational Projects**
  - San Diego
  - Houston
  - Minneapolis
  - Denver
  - Seattle
  - San Francisco/Oakland
Range of Interventions

- HOV to HOT lane conversion
- Requirement to obtain transponder
- Increase free usage to 3+ carpools
- Slugging possible
- Additional commuter transit service
Time Series Data Utilized

- Occupancy Counts
- Traffic counts (to assess vehicle and person throughput)
- License plate surveys (SEA and ATL)
- Carpool registrant surveys (ATL)

- Transponder applicant data (LA)*
- Vanpool data (SEA and LA)*

* being collected
Range of Impacts

1. Positive impacts (carpooling increased in managed lanes) – Minnesota I-35W
2. Neutral impacts (no change in carpooling) - Denver
3. Negative impacts (carpooling decreased in managed lanes) – Atlanta and Miami (and SF)
4. Variable impacts (carpooling increases and decreases) – San Diego and Minneapolis I-394
5. Other impacts (carpools shifted to free GP lanes) – Atlanta and Miami
Atlanta I-85

- 2-person CP tolled
- Transponder required
- Person throughput down 7% in a.m. and up 1% in p.m.
- Many 2-person CPs (38%) switched to GP lanes
- Few 3-person CPs formed
- 29% of existing CPs switched to drive alone
Miami I-95

Northbound Person Throughput by Vehicle Type and Percent Change from 2008 to 2010

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Express Lanes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOV</td>
<td>1061</td>
<td>3040</td>
<td>477</td>
<td>+247%</td>
</tr>
<tr>
<td>HOV 2</td>
<td>1899</td>
<td>171</td>
<td>171</td>
<td>-16%</td>
</tr>
<tr>
<td>HOV 3</td>
<td>1899</td>
<td>171</td>
<td>171</td>
<td>-35%</td>
</tr>
<tr>
<td><strong>General Purpose Lanes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOV</td>
<td>8080</td>
<td>8428</td>
<td>9300</td>
<td>+15%</td>
</tr>
<tr>
<td>HOV 2</td>
<td>7397</td>
<td>6282</td>
<td>8602</td>
<td>+16%</td>
</tr>
<tr>
<td>HOV 3</td>
<td>1858</td>
<td>2387</td>
<td>108</td>
<td>-94%</td>
</tr>
</tbody>
</table>
Minneapolis I-35W

I-35W HOV/HOT Lane Carpooling Throughput

- HOV transitioned to HOT and PDSL opened Oct. 2009
- New Crosstown Commons HOT lanes open Nov. 2010

Throughput from 6-9 AM on Weekdays

- Qtr 4, 2008
- Qtr 1, 2009
- Qtr 2, 2009
- Qtr 3, 2009
- Qtr 4, 2009
- Qtr 1, 2010
- Qtr 2, 2010
- Qtr 3, 2010
- Qtr 4, 2010
- Qtr 1, 2011
- Qtr 2, 2011
- Qtr 3, 2011
- Qtr 1, 2012
- Qtr 2, 2012
- Qtr 3, 2012
- Qtr 4, 2012
San Diego I-15

- 2+ carpools free
- Carpool volumes increased 7% first phase (monthly permit)
- Carpool volumes decreased during second phase (dynamic pricing) in both HOT and GP lanes (overall 15-32%)
- Longer term trends show stabilization
Probable Influence Factors

- Increase in occupancy requirement for free usage and challenges in forming 3-person carpools
- Requirement for carpools to register and obtain transponder
- Toll structure and changes therein
- Parallel transit service
- Conflicting regional HOV and HOT policies
- Exogenous factors (gas prices and employment)
Issues for Further Investigation

- **Policy** – e.g., are there conflicting policy objectives for HOV and HOT projects?
- **Analytic and Behavioral** – e.g., can existing analytic tools accurately predict impact on carpooling?
- **Operational** – e.g., can the negative impacts be mitigated?
- **Institutional** – e.g., what level of public understanding is needed for HOT conversion projects?
Implications

- Carpool support needed after HOT implementation
- Policy objectives need to be carefully considered
- Quantification of actual impacts necessary for better future predictive exercise
- Lessons can be learned from HOT pioneers
- Continuing investigation and assessment needed
More Information

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Impacts of Congestion Pricing on Transit

Brian Pessaro, AICP

FHWA Webinar
September 17, 2013
I-85 Express Lanes
Atlanta

I-35W MnPass Lanes
Minneapolis

I-95 Express Lanes
Miami

SR 520 Bridge
Seattle
# More Average Daily Riders

<table>
<thead>
<tr>
<th>UPA Site</th>
<th>Before HOT</th>
<th>After HOT</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miami</td>
<td>1,827</td>
<td>2,877</td>
<td>57%</td>
</tr>
<tr>
<td>Minneapolis</td>
<td>4,572</td>
<td>4,649</td>
<td>8%</td>
</tr>
<tr>
<td>Atlanta</td>
<td>1,210</td>
<td>1,459</td>
<td>21%</td>
</tr>
<tr>
<td>Seattle</td>
<td>4,441</td>
<td>4,889</td>
<td>24%</td>
</tr>
</tbody>
</table>

Figures reflect a.m. peak period
Seattle figures are for eastbound and westbound combined
Ridership

Minneapolis

Atlanta

Seattle

Intermediate

Post Toll
# Shorter Travel Times

<table>
<thead>
<tr>
<th>UPA Site</th>
<th>Before HOT</th>
<th>After HOT</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miami</td>
<td>25.0 min</td>
<td>8.2 min</td>
<td>-67%</td>
</tr>
<tr>
<td>Minneapolis</td>
<td>20.0 min</td>
<td>15.6 min</td>
<td>-22%</td>
</tr>
<tr>
<td>Atlanta</td>
<td>47.2 min</td>
<td>42.4 min</td>
<td>-10%*</td>
</tr>
<tr>
<td>Seattle (west)</td>
<td>5.3 min</td>
<td>5.1 min</td>
<td>-4%</td>
</tr>
<tr>
<td>Seattle (east)</td>
<td>6.1 min</td>
<td>5.2 min</td>
<td>-15%</td>
</tr>
</tbody>
</table>

Figures reflect a.m. peak period
Variation in travel time due to variation in HOT segment length
## Rider Perceptions of Travel Time

<table>
<thead>
<tr>
<th>UPA Site</th>
<th>Before HOT</th>
<th>After HOT</th>
<th>Statistical Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miami</td>
<td>4.05</td>
<td>4.51</td>
<td>Yes</td>
</tr>
<tr>
<td>Minneapolis</td>
<td>4.18</td>
<td>4.26</td>
<td>Yes</td>
</tr>
<tr>
<td>Seattle</td>
<td>4.22</td>
<td>4.23</td>
<td>No</td>
</tr>
</tbody>
</table>

### Rating Scale

1. Very Poor  
2. Poor       
3. Fair       
4. Good       
5. Very Good
## Rider Perceptions of Reliability

<table>
<thead>
<tr>
<th>UPA Site</th>
<th>Before HOT</th>
<th>After HOT</th>
<th>Statistical Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miami</td>
<td>4.06</td>
<td>4.37</td>
<td>Yes</td>
</tr>
<tr>
<td>Minneapolis</td>
<td>4.33</td>
<td>4.37</td>
<td>No</td>
</tr>
<tr>
<td>Seattle</td>
<td>4.24</td>
<td>4.14</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Very Poor</td>
</tr>
<tr>
<td>2</td>
<td>Poor</td>
</tr>
<tr>
<td>3</td>
<td>Fair</td>
</tr>
<tr>
<td>4</td>
<td>Good</td>
</tr>
<tr>
<td>5</td>
<td>Very Good</td>
</tr>
</tbody>
</table>
Previous mode of new transit riders

**Miami**
- Drove Alone: 45%
- Carpoole: 11%
- Used Other Transit: 2%
- Didn't Make Trip: 3%
- Other: 3%

**Minneapolis**
- Drove Alone: 37%
- Carpoole: 9%
- Used Other Transit: 22%
- Didn't Make Trip: 3%
- Other: 29%

**Seattle**
- Drove Alone: 41%
- Carpoole: 13%
- Used Other Transit: 35%
- Didn't Make Trip: 9%
- Other: 2%
Did the tolls influence new riders to take transit?

**Miami**
- Yes: 47%
- No: 53%

**Minneapolis**
- Yes: 23%
- No: 77%

**Atlanta**
- Yes: 49%
- No: 51%

**Seattle**
- Yes: 45%
- No: 55%
What had more influence on Seattle transit riders?

- Most new riders in Seattle were unaware or uninfluenced by the UPA-funded transit service that began prior to SR 520 tolls.
- The SR 520 tolls had a greater influence.
Other Observations
Atlanta riders loved the transit service but not the priced lane

• In pre-toll survey 60% **disapproved** converting I-85 HOV lane to HOT
  – Only 9% approved

• In the post-toll survey
  – Only 18% said I-85 Express Lanes improved travel
  – Only 13% said they have been good for Atlanta
Transit riders from other UPA sites were more positive about the tolls

- In Seattle, 57% said the SR 520 tolls have improved their travel and 42% said the tolls have been good for the region.
- In Minneapolis, 61% said the MnPass lanes have improved bus travel speeds and 55% said the MnPass lanes improved bus reliability.
- In Miami, over 80% of transit riders said their bus travel time was faster after the I-95 Express Lanes opened.
Contact Information

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I-15 Managed Lanes and FasTrak: Lessons Learned for Transit

FHWA Webinar: Impacts of Congestion Pricing on Carpooling and Transit
September 17, 2013
Role of Managed Lanes

- Focus of 2050 Regional Transportation Plan is a multi-modal strategy
  - Provide “travel choices”
  - Offer time competitive travel time for alternative modes
  - Increase freeway operating efficiency

- Managed Lanes are “dynamic”
  - Users, access, pricing all can adjust time depending on changing conditions
I-15 Managed Lanes Design

- Barrier-separated, 4-lanes, movable barrier
- Direct Access Ramps every 4-5 miles
- Off-line BRT transit stations and park-n-rides
- FasTrak for SOV buy-in – dynamic pricing
Direct access ramps open to BRT, carpools, and FasTrak customers.
Multiple access points, dynamic pricing strategy
Managed Lanes: I-15 Results

Increased use of HOV Lanes
- Up to 20,000 avg daily users
  (75% HOV, 25% FasTrak)

Provides travel choices
- Transit, carpool, FasTrak

FasTrak revenues to transit
- Generated over $7 million for I-15 transit in first decade
Moving People, Not Just Cars

Number of People per Hour per Lane on I-15

21% More People Moved During Avg P.M. Commute

<table>
<thead>
<tr>
<th>Time</th>
<th>General Purpose Lane</th>
<th>Managed Lane</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 pm</td>
<td>1,000</td>
<td>800</td>
</tr>
<tr>
<td>3 pm</td>
<td>1,500</td>
<td>1,200</td>
</tr>
<tr>
<td>4 pm</td>
<td>2,000</td>
<td>1,600</td>
</tr>
<tr>
<td>5 pm</td>
<td>2,500</td>
<td>2,000</td>
</tr>
<tr>
<td>6 pm</td>
<td>3,000</td>
<td>2,500</td>
</tr>
</tbody>
</table>
I-15 BRT Operations

- Serves long distance trips
  - “Trolley-on-tires”
- High speed
  - Stations spaced 4-5 miles avg
  - Managed Lanes = transitway
- Service includes:
  - All-stop, all day trunk
  - Peak period limited stop commuter expresses
- Opens in 2015
Approval of FasTrak By Age, Ethnicity, Income
I-15 Managed Lanes/BRT – Lessons Learned

- Managed Lanes = collaboration between SANDAG, Caltrans, and transit operators
  - SANDAG lead, but joint vision/decisionmaking

- Local TransNet program:
  - Provides local match to federal/state funding
  - Provides both BRT capital & operating funding
I-15 Managed Lanes/BRT – Lessons Learned

• Moving people, not cars
  - Managed lanes improves efficiency of highway system

• HOV/BRT travel time benefits
  - Provides incentive for ridesharing and taking transit
I-15 Managed Lanes/BRT – Travel Times

- **Auto**
- **Carpool**
- **Transit (Walk)**
- **Transit (Park & Ride)**

**Existing (2000)**
- Travel Time from Escondido to Kearny Mesa

**2030**
- Travel Time from Escondido to Kearny Mesa
I-15 Managed Lanes/BRT – Lessons Learned

- HOV Users:
  - Represent 80% of demand
  - HOV use increased with FasTrak program
  - 4-lane facility enables 2+ person occupancy plus BRT and FasTrak
  - Future demand shows need for 3+ person occupancy by 2035 – will need to look at possible peak/off-peak occupancies
I-15 Managed Lanes/BRT – Lessons Learned

• FasTrak Program
  - Expands travel choices
  - Ensures free-flow conditions for BRT
  - Resolves equity issue by helping fund BRT operations

• Future Managed Lanes
  - Likely to be buffer-separated, fewer DARs due to high costs and ROW impacts
Managed Lanes: Why Tolling and Transit Work

• Success of BRT premised on fast travel times and schedule reliability
• Managed Lanes provide a multi-modal guideway for BRT and carpooling
• Problem: how to guarantee that Managed Lanes don’t become congested?
• Solution: Tolling
  - Tolling works only if Managed Lanes operate in free-flow conditions
  - Win-win for BRT, carpooling, and tolling
Future Opportunities and Challenges

- 2050 Plan - expand Managed Lanes/BRT/tolling to other corridors
Future Opportunities and Challenges

• 2050 Plan - expand Managed Lanes/BRT/tolling to other corridors

• Priority remains to BRT and ridesharing; FasTrak fills excess capacity

• With growth, maintaining free flow conditions is key challenge
  - Carpool occupancy increase to 3+ persons?
  - FasTrak toll costs?
  - Need for dedicated BRT/LRT lanes?
Future Opportunities and Challenges

• Future Managed Lanes
  - Likely to be buffer-separated, fewer DARs due to high costs and ROW impacts
  - Some initially will be one lane facilities

• FasTrak Program
  - Can it work with one lane HOT lane? Winners and losers – carpools or FasTrak users?
Future Opportunities and Challenges

Automated Highways
2050 Regional Transportation Plan - Transit Network
San Diego
I-15 Managed Lanes and FasTrak: Lessons Learned for Transit

Dave Schumacher
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Congestion Pricing Impacts on Carpools & Transit
September 17, 2013

Transit Perspective
Sound Transit District
ST Express Regional
Bus and transit projects
Gaining and Maintaining Acceptance

- Transit agencies are key stakeholders in dealing with congestion;
- Should be a partner in early planning, design and dealing with operational issues of congestion pricing;
- Transit can help address equity issues.
Congestion Pricing beneficial and supported by transit agencies due to these potentials depending on pricing method

- Reduce Peak Hours SOV demand;
- Raise revenue for system and transit improvements;
- Maximize system through-put;
- Maintain HOV system at higher performance levels.
Congestion Pricing does impact transit services and facilities

- Increases ridership demand on already congested facilities, like park and ride facilities and transit centers;
- Increases peak hour ridership demands on transit. Difficult and expensive to add peak hour bus service;
- HOV/HOT lanes need to be well managed; performance measures need to be established up front;
- Transit speed & reliability critical to ridership.
Congestion Pricing programs and revenues need to consider public transportation impacts

- Legislation can restrict use of revenues only to corridor and only to highway purposes;
- Public transit should not be tolled;
- Toll objectives should be clear;
- Peak hour tolls should be higher than transit fares.
Any questions?

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