

# I-405 Express Toll Lanes Rate Setting

**Craig J. Stone, P.E.**

Assistant Secretary  
Toll Division

**Rob Fellows**

Policy and Planning Manager  
Toll Division

**Washington State Transportation Commission**  
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# Presentation Purpose and Agenda

## Objectives:

- Provide information to support decisions in February on minimum and maximum toll rates and Pay By Mail differential
- Identify additional information needed to make rate setting and exemption decisions in February

## Agenda:

- I-405 rate setting actions, process and schedule
- How dynamic tolling works
- Maximum toll rate
- Minimum toll rate
- Pay By Mail differential
- Non-carpool exemptions
- Identify additional information needed

# I-405 Rate Setting Actions and Decisions Needed

**The Commission will determine the structure for dynamic tolls, including:**

- **Maximum toll rate**
- **Minimum toll rate**
- **Pay By Mail differential**
- **Exemptions**  
*(Note – by statute, transit and vanpools must be exempt on I-405)*
  - Emergency vehicles / incident response / maintenance vehicles
  - Private buses
  - Motorcycles
  - Carpools (defined as 2+ or 3+ occupancy)

# I-405 Express Toll Lanes Rate Setting Milestones

	Milestone
<b>November 2013</b>	Executive Advisory Group report out Kickoff rate setting Present funding and phasing draft findings Discuss carpool and motorcycle policies Clarify rate setting information needs
<b>December 2014</b>	Discuss carpool policy Provide information on “everyone pays” scenario File CR 101 (Statement of Inquiry)
<b>January 2014</b>	Discuss minimum and maximum rates Discuss Pay By Mail differential More discussion on exemptions Identify missing information
<b>February 2014</b>	WSTC proposed rates/exemptions
<b>April 2014</b>	Public Input meetings File CR 102 (Proposed Rule)
<b>May 2014</b>	Public Hearing Adopt toll rates/exemptions File CR 103 (Final Rule)

# How Dynamic Tolling Works

- **A computer algorithm adjusts toll rates based on traffic conditions to maximize traffic flow and performance**
  - Roadway sensors detect speed changes in express and general purpose lanes
  - Changes in volume and speed trigger step increases or decreases
  - Rates are sent to and displayed on overhead roadway signs
  - Drivers pay the rate displayed at the time they enter the express toll lanes
- **There is a tradeoff between performance and availability**
  - Can raise rates or switch to HOV-only when speeds drop below 45 MPH
  - HOV-only means lanes are unavailable to paid users when needed most
- **Similarities to SR 167 HOT Lane System**
  - Different rates will appear as traffic conditions change
  - Adjustments can be made to the algorithm based on operating experience (how often rates are calculated, how quickly they step up and down, etc.)
- **Differences from SR 167 HOT Lane System**
  - Algorithm owned and maintained by State
  - Integrated with traffic management systems
  - Allows customization to accommodate multiple segments and facilities

# How Dynamic Tolling Works

- **I-405 System**

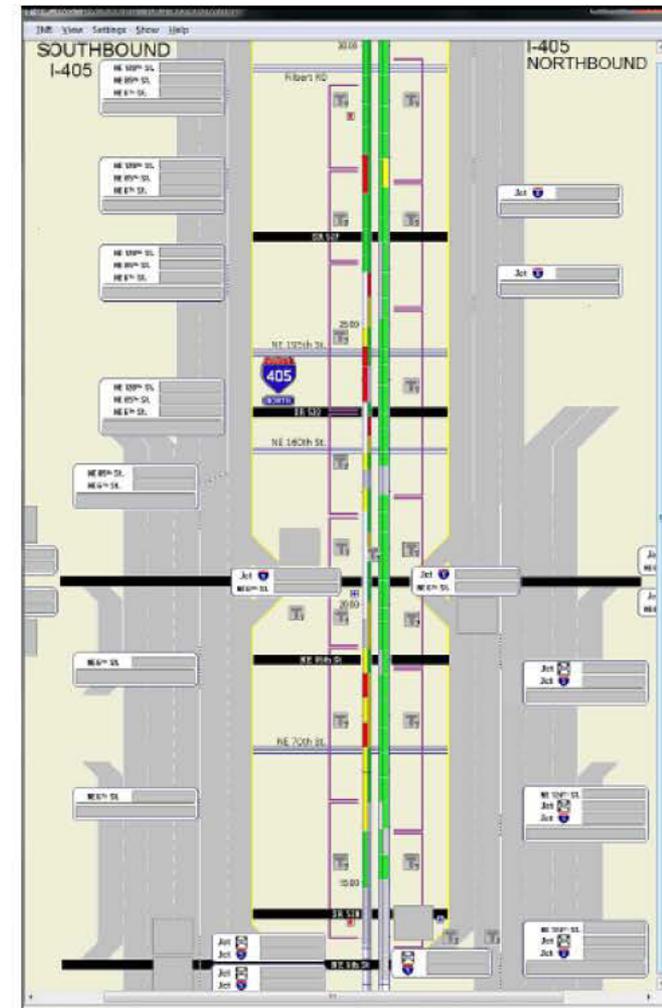
- 800+ roadway sensors measure volume and speed
- Generally spaced at ½ mile intervals including ramps
- Rates calculated every minute and sent to roadside toll systems vendor every 5 minutes (adjustable if needed)
- Historical rate tables allow operation to continue if communications temporarily interrupted

- **Under normal traffic operations**

- Traffic engineers at the operations center monitor system performance

- **In case of major blocking accidents or incidents**

- Traffic center engineers integrate toll operation with message signs and other traffic management tools
- May switch from dynamic rates to implement established incident management protocols



*Prototype of traffic management center toll operation monitoring system*

# Modeling Analysis Toll Assumptions

- Minimum toll and Pay By Mail toll increment values have been previously discussed using the constant dollar values used in modeling analysis
- Modeling analysis assumed escalation of these values for inflation; therefore, values are higher in year of collection dollars
- Analysis did not assume a maximum toll rate

Toll Assumption	Base Year Modeling Assumptions			Inflated to Year of Collection	
	Value	Value Estimation Year	Annual Escalation Assumption	In FY 2016 (Year of Opening) Dollars*	In FY 2017 (Second Year of Operations) Dollars*
<b>Minimum Toll Rate</b> <i>(Good To Go!)</i>	<b>\$0.75</b>	<b>CY 2014<sup>1</sup></b>	<b>2.5% per Year</b>	<b>\$0.80</b>	<b>\$0.80</b>
<b>Pay By Mail Toll Differential</b>	<b>\$1.50</b>	<b>CY 2012<sup>2</sup></b>	<b>2.5% per Year</b>	<b>\$1.65</b>	<b>\$1.70</b>

\* Rounded to nearest nickel

<sup>1</sup> 2014 was the opening year assumption when modeling started; equivalent to \$0.71 in 2012 dollars

<sup>2</sup> Set to match SR 520 assumptions by year through FY 2017

# Maximum Toll Rate

- **The Commission may elect to set a maximum toll rate for I-405 express toll lanes**
- **If the algorithm proposes a rate higher than the maximum, the toll system would either:**
  - Remain at the maximum rate allowing performance to degrade, or
  - Switch to HOV-only making the lane unavailable to paying customers
- **The choice of a maximum toll rate is not strictly technical, but based on perception of public acceptability**
  - Equity concerns may result from very high toll rates
  - Setting a high maximum can also be construed that high rates are likely
  - Setting a low maximum can result in poor performance or availability
- **Local precedent: SR 167 HOT Lane maximum rate is \$9.00**
  - Rationale: approximately \$1.00 per mile, and less than \$10.00 threshold
  - \$9.00 rate has very rarely been hit, during initial operation only
  - Average peak hour, peak direction rate is \$2.50 southbound in the PM and \$3.50 northbound in the AM

# Maximum Toll Rate

## National Examples

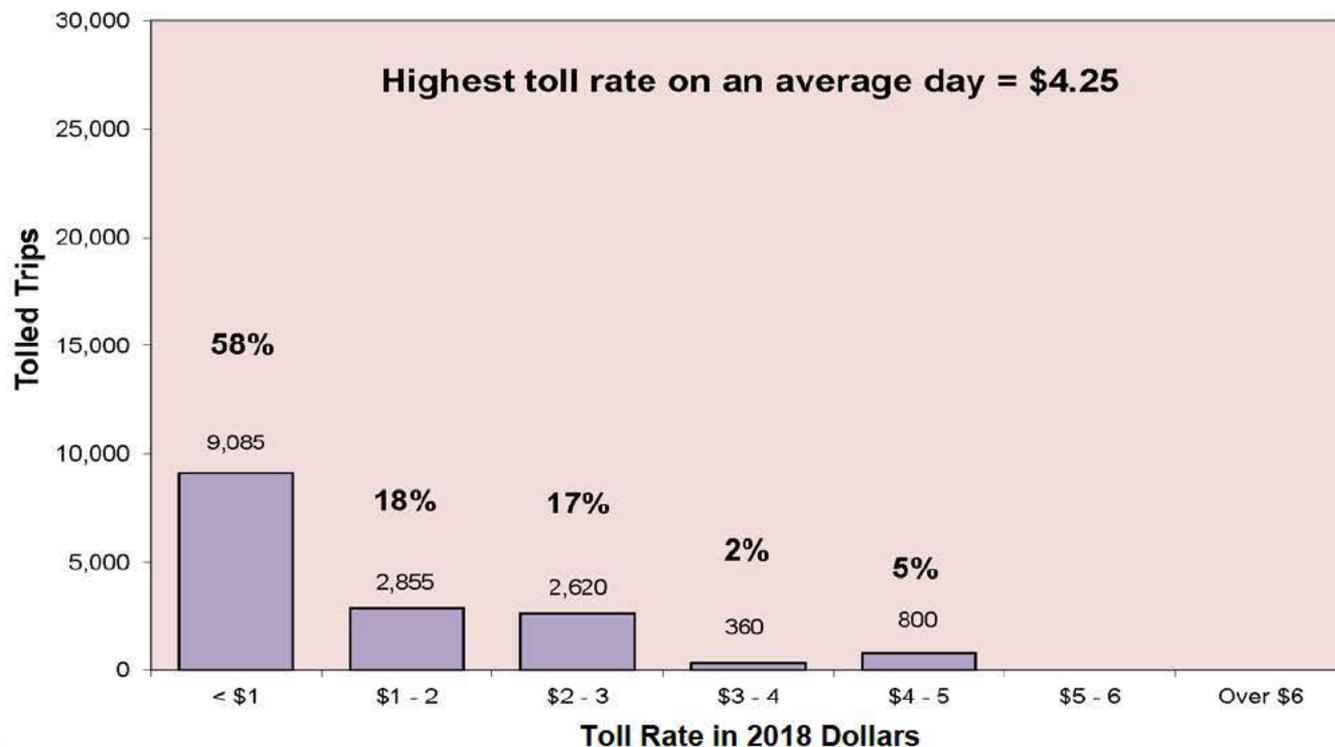
	Primary Goal	Length	Maximum Toll
SR 91 Orange County, CA	Revenue	10 miles	No maximum. Fixed schedule adjusted based on 90-day performance, current highest rate is \$9.55 Currently, \$0.95 per mile
I-495 Capital Beltway Virginia	Revenue	14 miles	No maximum
I-95 Miami, FL	Revenue	7 miles	\$7.00 \$1.00 per mile
I-85 Atlanta, GA	Traffic	15 miles	\$13.50 for full length \$0.90 per mile
I-394 Minneapolis, MN	Traffic	11 miles	\$8.00 \$0.73 per mile
I-10/I-110 Los Angeles CA	Traffic	I-10:14 miles I-110:11 miles	I-10: \$19.60 for full length I-110: \$15.40 for full length \$1.40 per mile for each
I-10 Katy Managed Lanes Houston, TX	Traffic	12 miles	\$7.00 (Fixed time of day schedule/does not vary dynamically) \$0.58 per mile

## What Toll Rates does the Model Predict?

- Models predict traffic and revenue on an average day
- For Bellevue to Lynnwood I-405 project, in 2018 most peak period tolls are projected at \$1.00 or less

### I-405 Bellevue to Lynnwood

2018  
Projected  
Distribution  
of Weekday  
Peak Period  
Tolls on an  
Average Day



Source: CDM Smith Traffic and Revenue Report

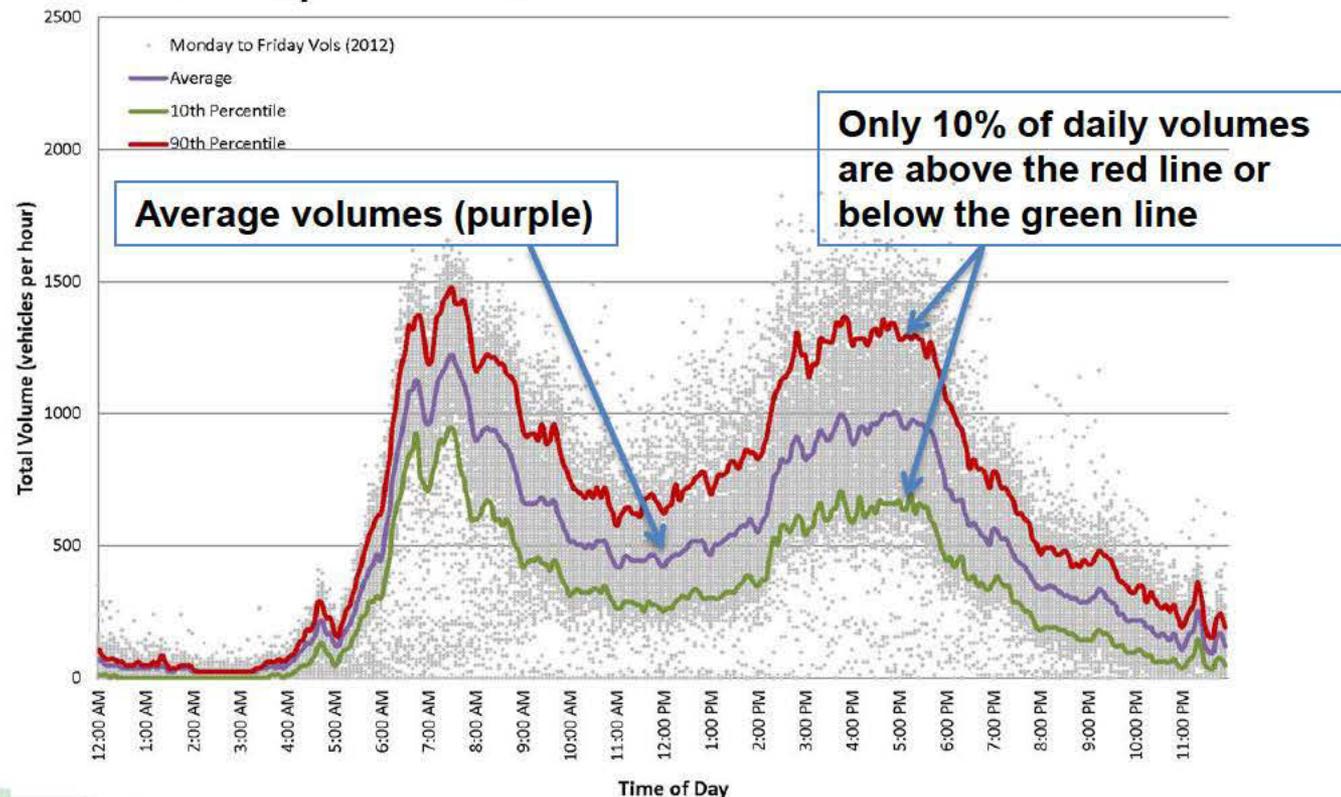
## What Difference does Variability Make?

- Traffic volumes vary by day of the week and season, and due to weather, incidents and accidents
- As volume nears capacity, small increases in volume have a large impact on congestion and express toll lane rates

**I-405  
Southbound**

**2012 HOV  
Volumes**

**Monday - Friday  
South of SR 527**



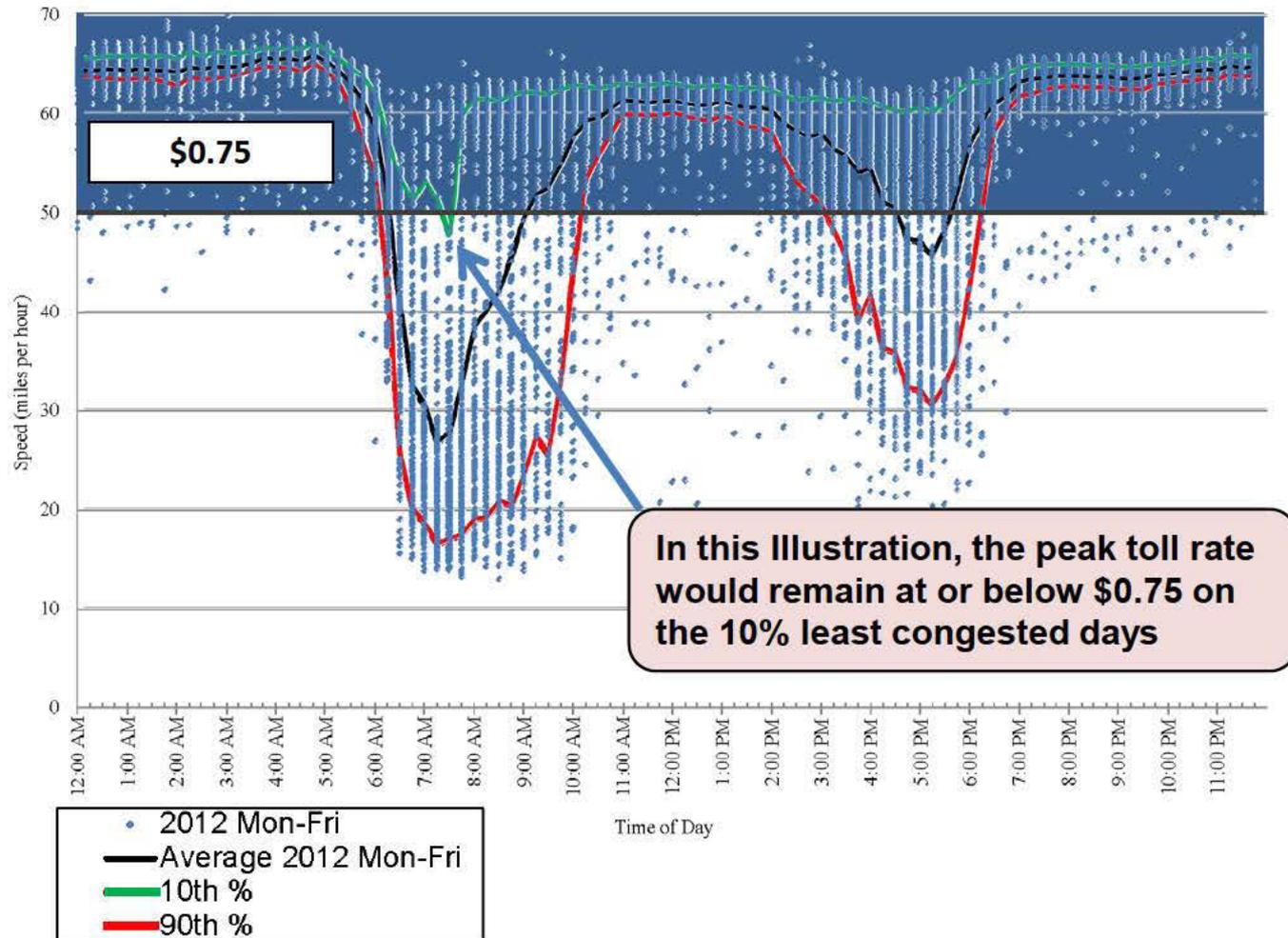
# Maximum Toll Rate

## Variability is Responsible for Highest Rates

- General purpose lane congestion increases demand for use of the express toll lanes
- A typical day would have rates between \$0.75 and \$4.00
- Toll rates not expected to reach highest levels except for rare, extremely congested days

I-405 Southbound

2012  
General Purpose  
Speed  
Monday - Friday



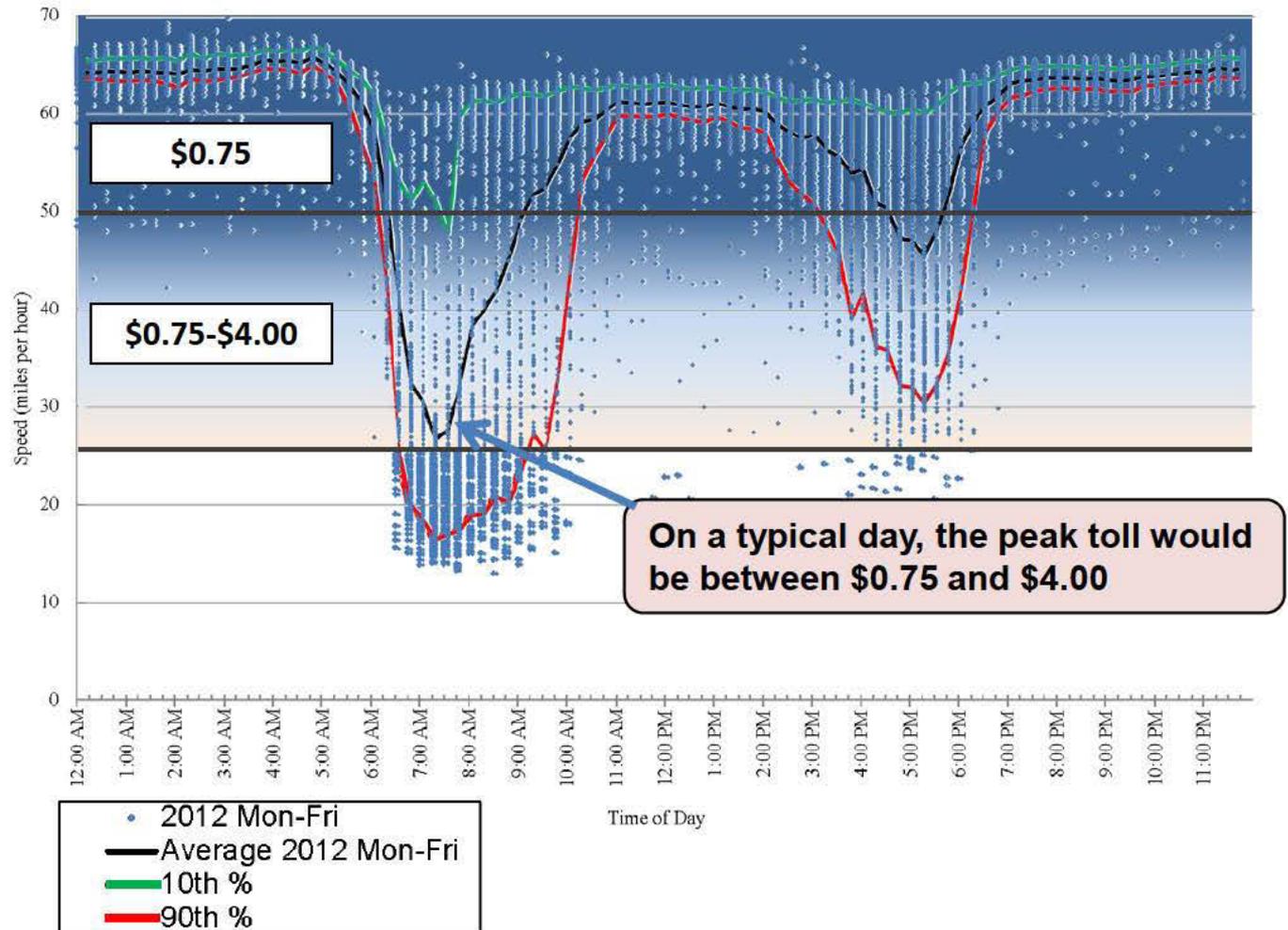
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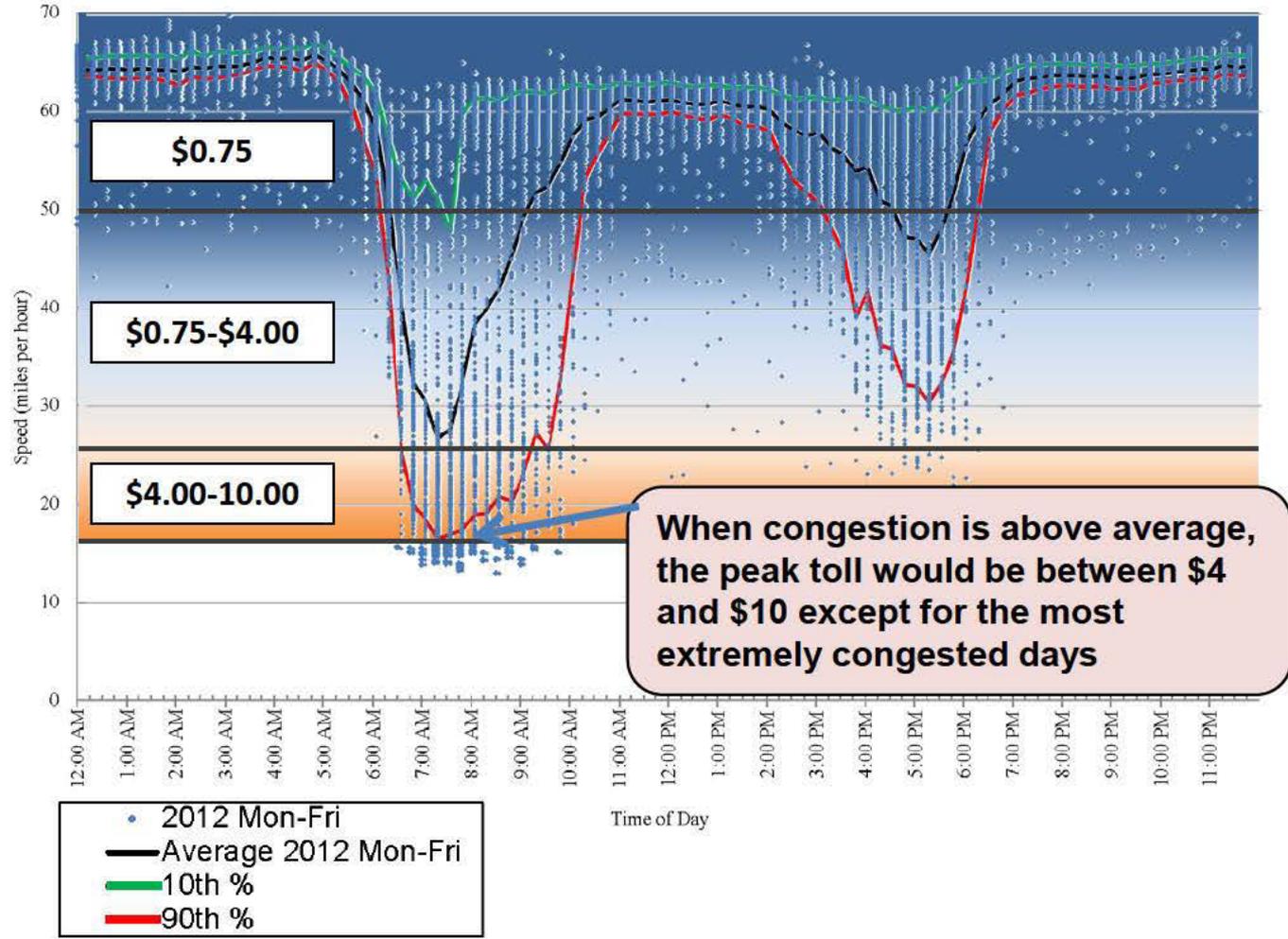


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**General Purpose**  
**Speed**  
**Monday - Friday**



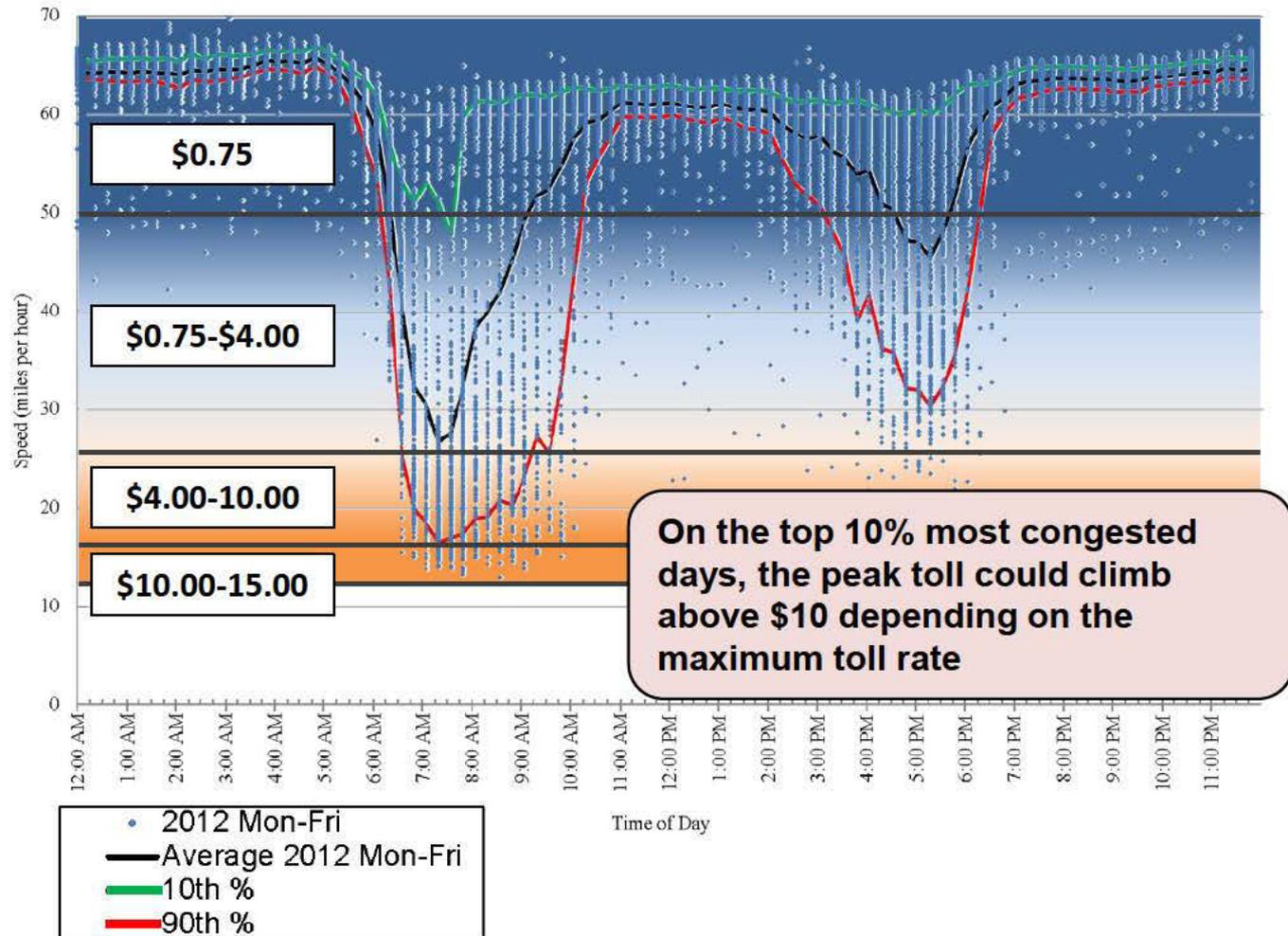
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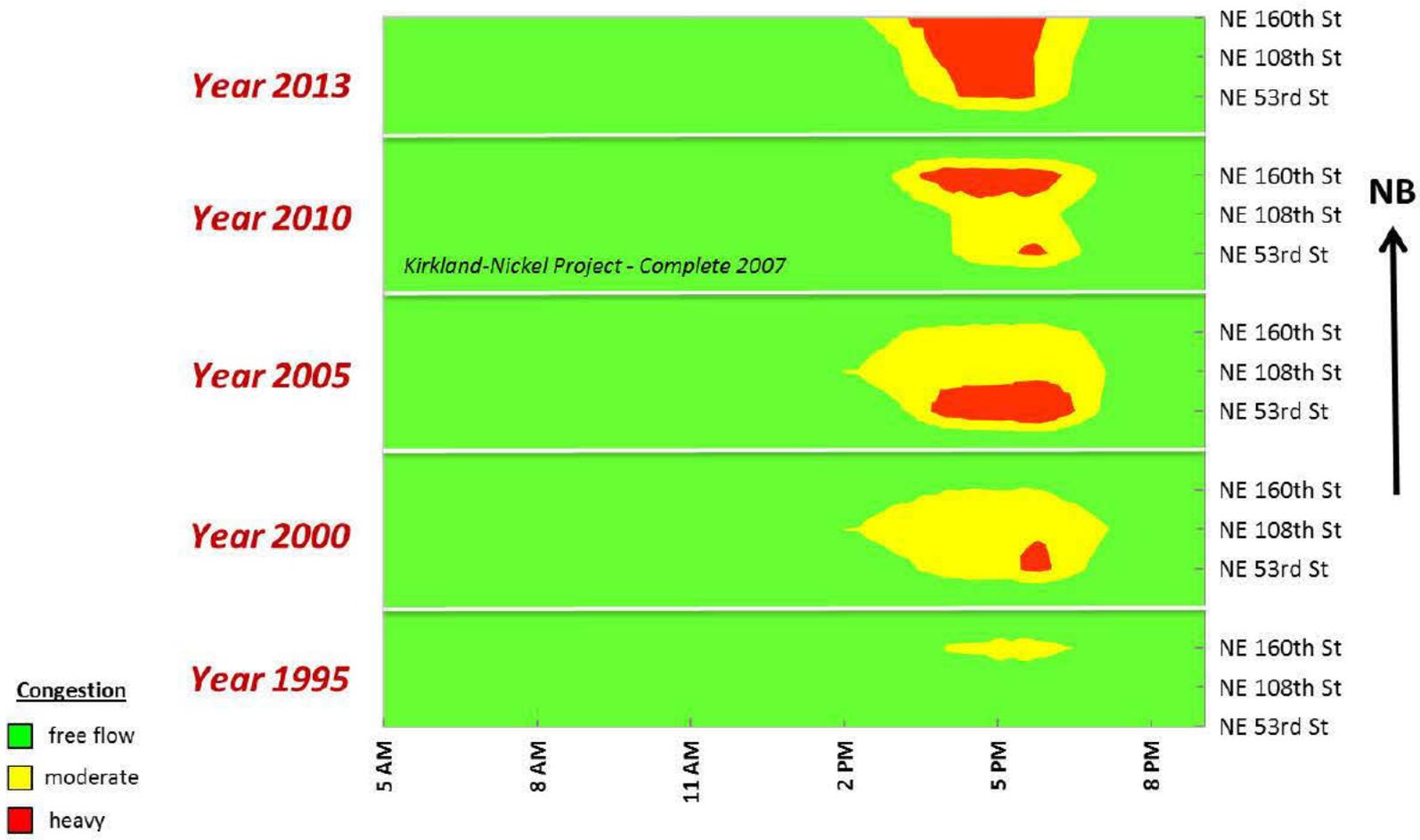
I-405 Southbound

2012  
General Purpose  
Speed  
Monday - Friday



# Maximum Toll Rate

## I-405 Congestion Has Continued to Rise



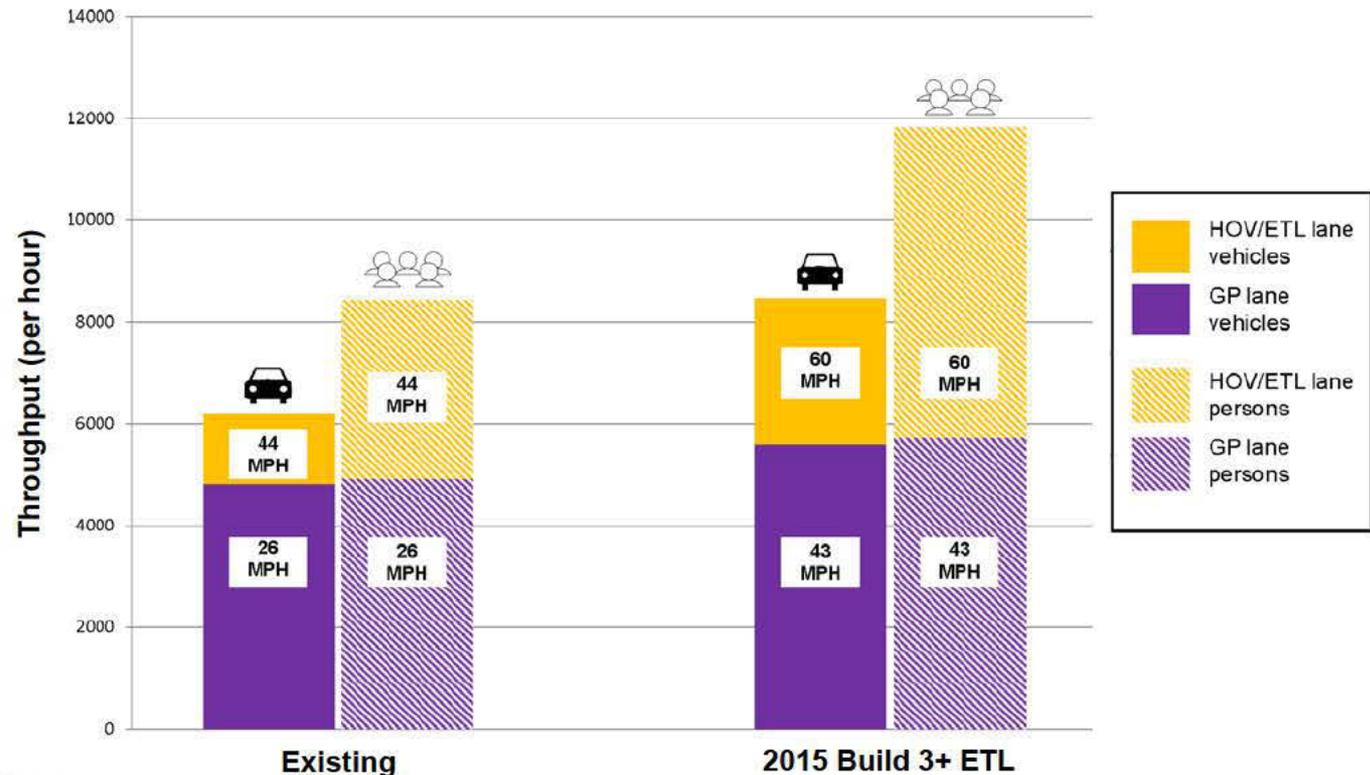
# Vehicle and Person Throughput

- The existing facility includes 3 general purpose lanes (purple) and one HOV lane (yellow)
- Adding a second express toll lane (yellow in 2015 graphic) increases speeds and person throughput in both general purpose and express toll lanes

## I-405 Southbound Vehicle and Person Volume

2012 and 2015,  
AM peak

Kirkland Area



# Maximum Toll Rate

## Policy Options

- **No maximum toll rate**
  - Let algorithm set traffic-appropriate rates
  - Avoids performance and availability issues
  - Occasional high rates may raise public concerns
- **\$9.00 maximum toll rate**
  - Consistent with SR 167 maximum toll rate
  - Will result in performance/availability issues sooner than higher rate
- **\$15.00 maximum toll rate**
  - Consistent with SR 167 methodology (\$1.00 per mile maximum)
  - Consistent with national examples
  - Likely to be sufficient for several years
- **Planning assumption: No maximum toll rate**

# Minimum Toll Rate

- **The Commission may choose to set a minimum toll rate for I-405 express toll lanes**
  - Local precedent: SR 167 minimum is \$0.50
  - Modeling assumed \$0.80 as minimum toll in opening year
  - Assumed in effect between 5AM and 8PM, WSDOT considering whether 24 hour operation makes sense
- **Minimum toll should cover toll collection cost**
- **Minimum toll should raise sufficient revenue**
  - A majority of toll transactions will be at the minimum rate
  - Significant contribution to revenue for the initial I-405 segment
- **A low minimum toll will improve express toll lane use and lessen concerns about equity**

# Minimum Toll Rate

## National Examples

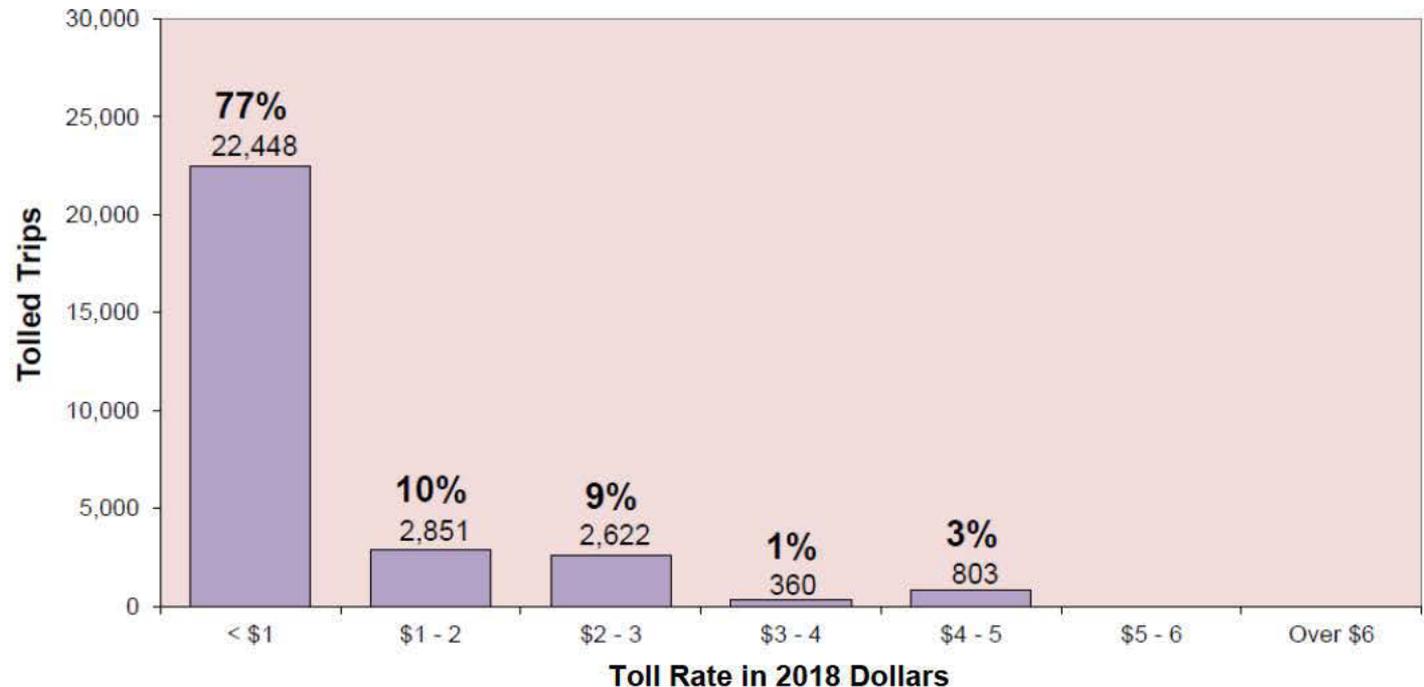
	Primary Goal	Length	Minimum Toll
SR 91 Orange County, CA	Revenue	10 miles	Current lowest rate is \$1.40
I-495 Capital Beltway Virginia	Revenue	14 miles	\$0.20 per mile
I-95 Miami, FL	Revenue	7 miles	\$0.25
I-85 Atlanta, GA	Traffic	15 miles	\$0.01 per mile
I-394 Minneapolis, MN	Traffic	11 miles	\$0.25 per zone (2 zones)
I-10/I-110 Los Angeles CA	Traffic	I-10:14 miles I-110:11 miles	\$0.25 per mile for each
I-10 Katy Managed Lanes Houston, TX	Traffic	12 miles	\$0.30 to \$0.40 per zone (3 zones)

## What Toll Rates does the Model Predict?

- The model predicts that tolls will be less than \$1.00 for most of the average day
- In the first years of operation, the minimum toll will apply for most trips

### I-405 Bellevue to Lynnwood

### 2018 Projected Distribution of Weekday Tolls on an Average Day



Source: CDM Smith Traffic and Revenue Report

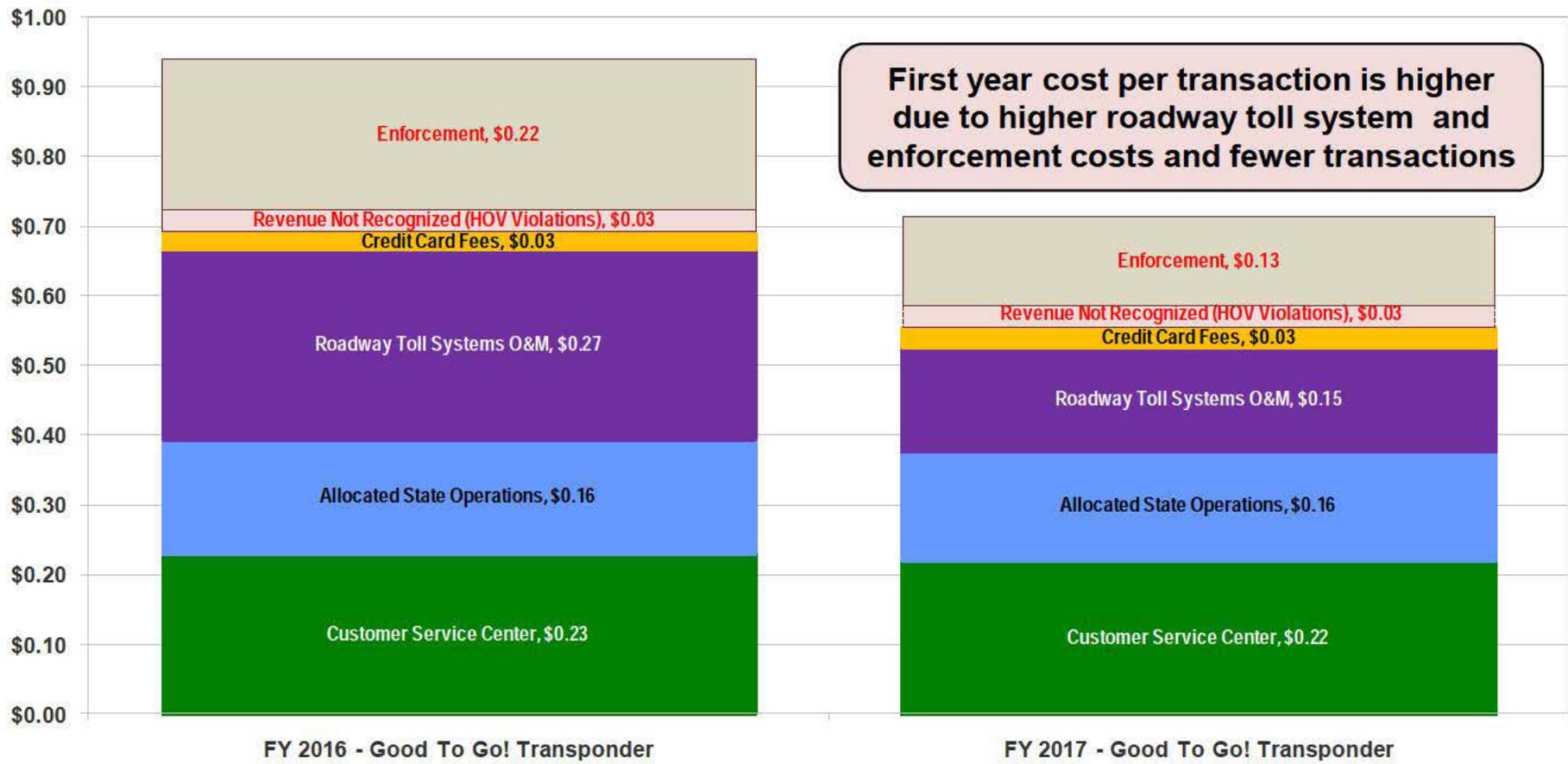
# Components of *Good To Go!* Transaction Costs

- **Toll collection cost components include:**
  - Allocated customer service center vendor cost (manages accounts)
  - Lane systems vendor cost (collects transaction data)
  - Allocated state overhead costs
  - Allocated credit card fees
- **Allocation of shared costs between toll facilities**
  - Credit card fees are proportionate to I-405 share of total revenue
  - Other costs allocated based on I-405 share of all toll transactions
- **Other costs that could be considered:**
  - Lost toll revenues when drivers improperly declare as carpools
  - Enforcement cost for HOV compliance

# Minimum Toll Rate

## Projected Toll Collection Costs *Good To Go!*

3+ carpool free peak/2+ carpool free off-peak - FY 16 compared to FY 17



First year cost per transaction is higher due to higher roadway toll system and enforcement costs and fewer transactions

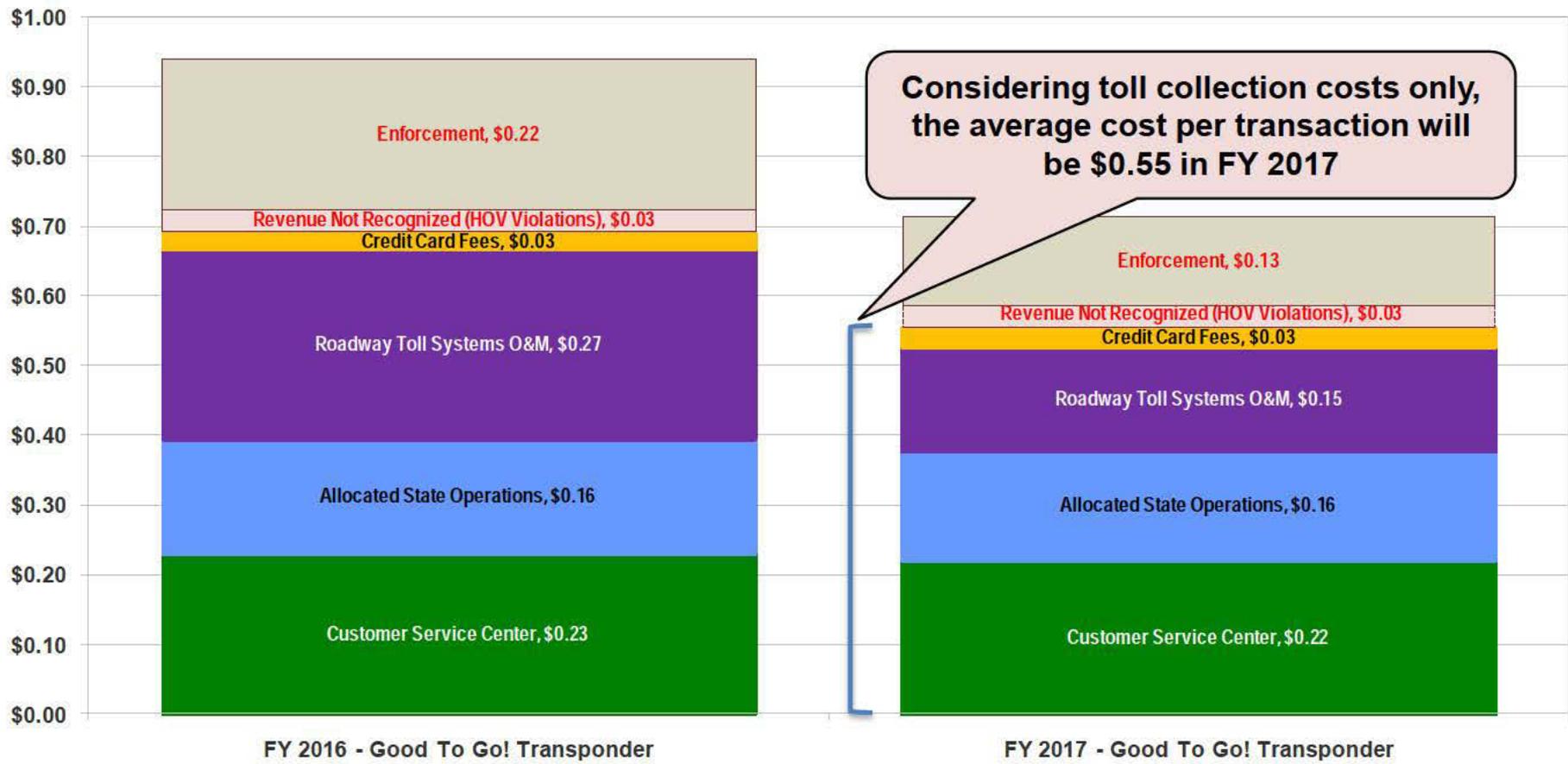
Toll Collection Costs	\$0.69	\$0.55
Above + Leakage	\$0.72	\$0.58
Above + Enforcement	\$0.94	\$0.71
<i>Average toll revenue per transaction</i>	<i>\$0.82</i>	<i>\$0.88</i>

Values in Year of Collection Dollars

# Minimum Toll Rate

## Projected Toll Collection Costs *Good To Go!*

3+ carpool free peak/2+ carpool free off-peak - FY 16 compared to FY 17



Considering toll collection costs only, the average cost per transaction will be \$0.55 in FY 2017

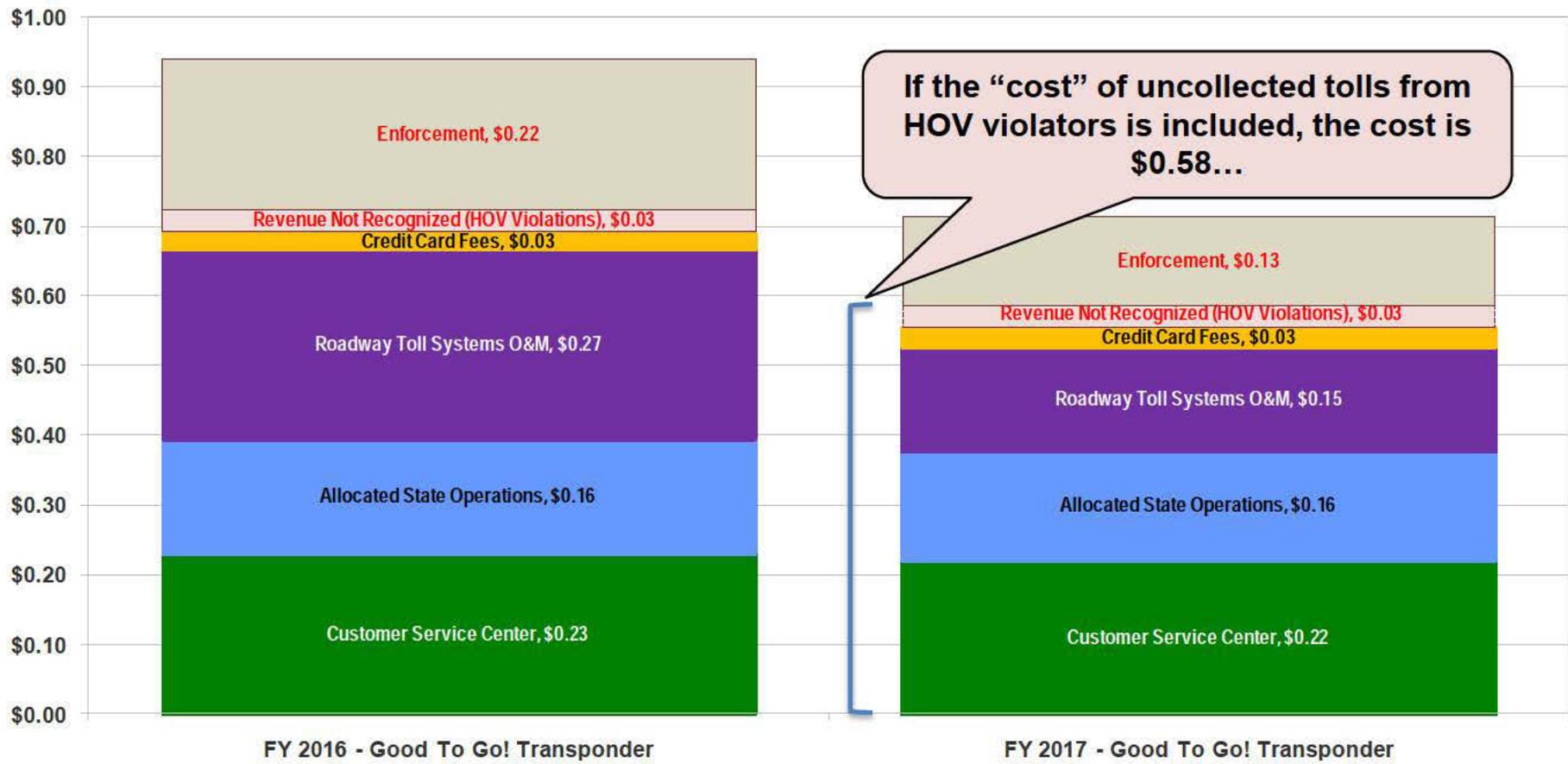
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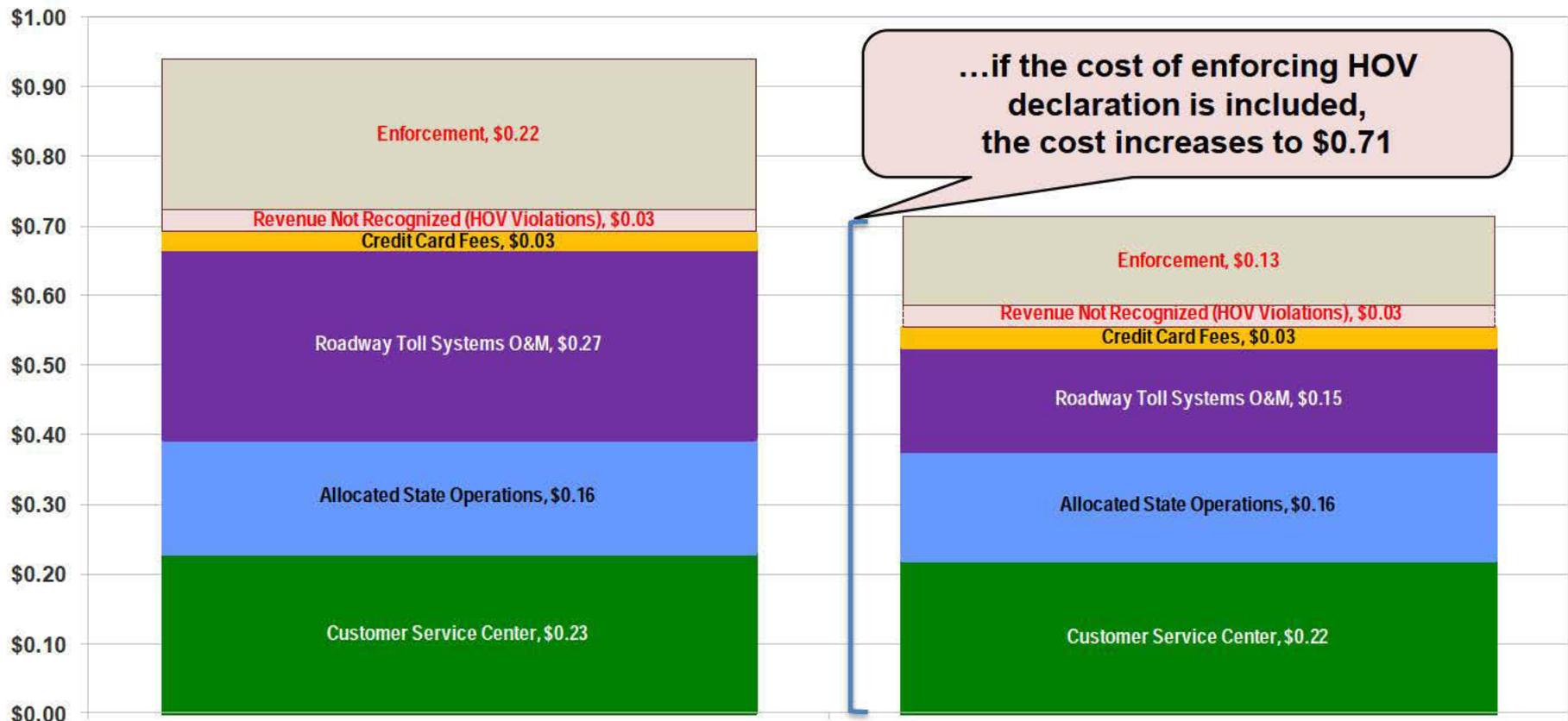
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Values in Year of Collection Dollars

# Minimum Toll Rate

## Policy Options

- **Options could include:**
  - \$0.50 (consistent with SR 167)
  - \$0.80 (consistent with modeling)
  - \$1.00 (may raise more revenue)
  - Others?
- **Considerations:**
  - Modeling shows \$0.80 needed to achieve revenue targets in FY 2017
  - \$0.80 or above covers average cost per transaction in FY 2017
  - SR 167 minimum rate has not been adjusted since opening
- **Planning assumption: \$0.80 minimum toll**

# Pay By Mail Differential

- **The Commission may set a toll differential for Pay By Mail transactions**
  - Higher cost due to mailing and address look-ups
  - Not all post-paid tolls will be collected
  - Modeling assumed a \$1.70 Pay By Mail toll differential in FY 2017
  - Increment would be added to dynamic toll cost
  - Signs would tell customers an additional charge applies
- **Local Precedent:**
  - Planned toll schedule has SR 520 Pay By Mail differential at \$1.70 in FY 2017 and financial plan does not rely on additional increases after that time
  - Tacoma Narrows Bridge is \$2.00 higher than *Good To Go!*
  - Intent to cover incremental costs and losses of payment method
- **Other options to consider in future rate setting cycle**
  - Make consistent: standardize the differential for all facilities

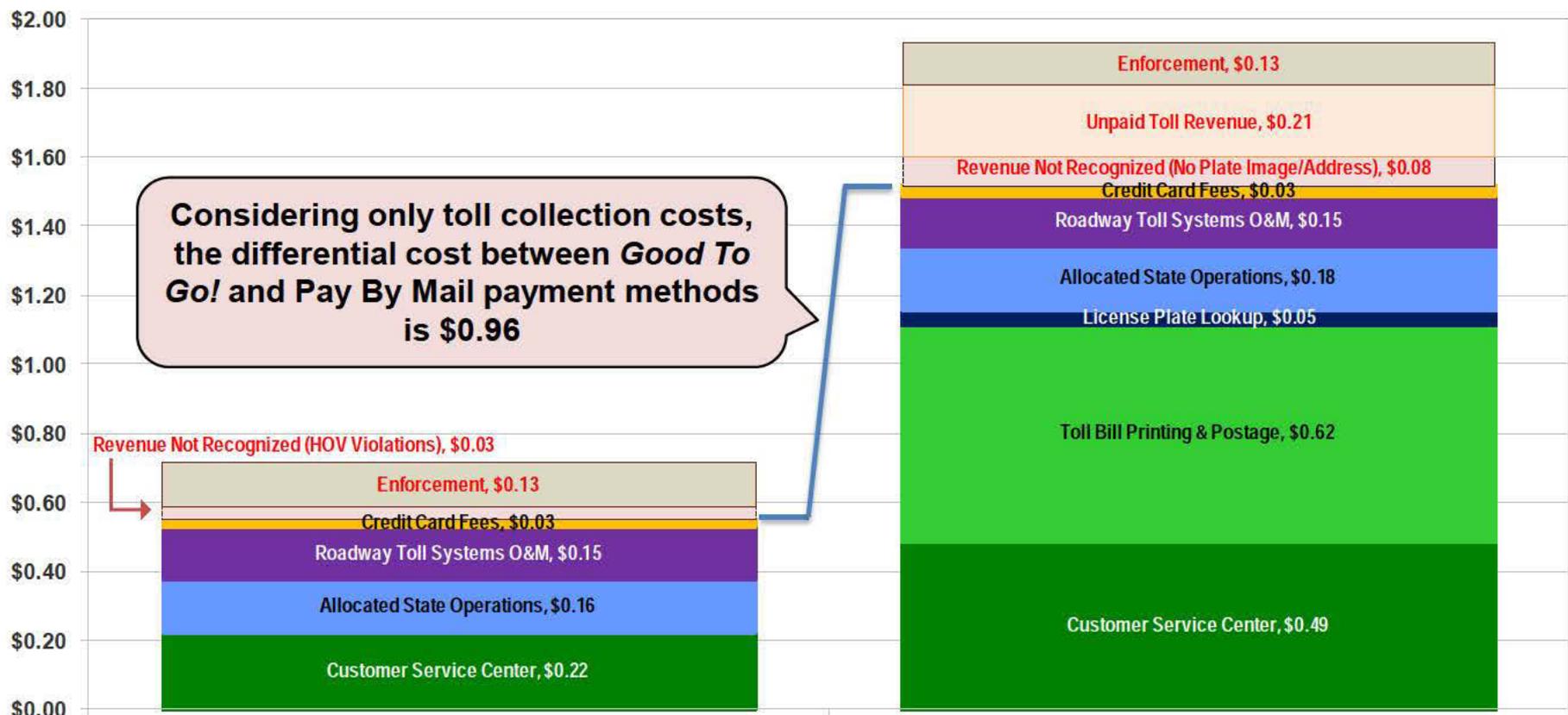
# Components of Pay By Mail Costs and Losses

- **Additional costs compared to *Good to Go!***
  - Printing and postage associated with toll bills
  - Out-of-state license plate lookup
- **Uncollected tolls**
  - Some transactions can't be billed due to unreadable license plates or unavailable addresses
  - Some tolls won't be paid within 80 days and may be captured instead as part of civil penalty revenue
- **Additional tolls may be received during the civil penalty process but are not included in the net revenues underlying the financial plan**

# Pay By Mail Differential

## Projected Toll Collection Costs By Payment Method

3+ carpool free peak/2+ carpool free off-peak - FY 2017 Comparison



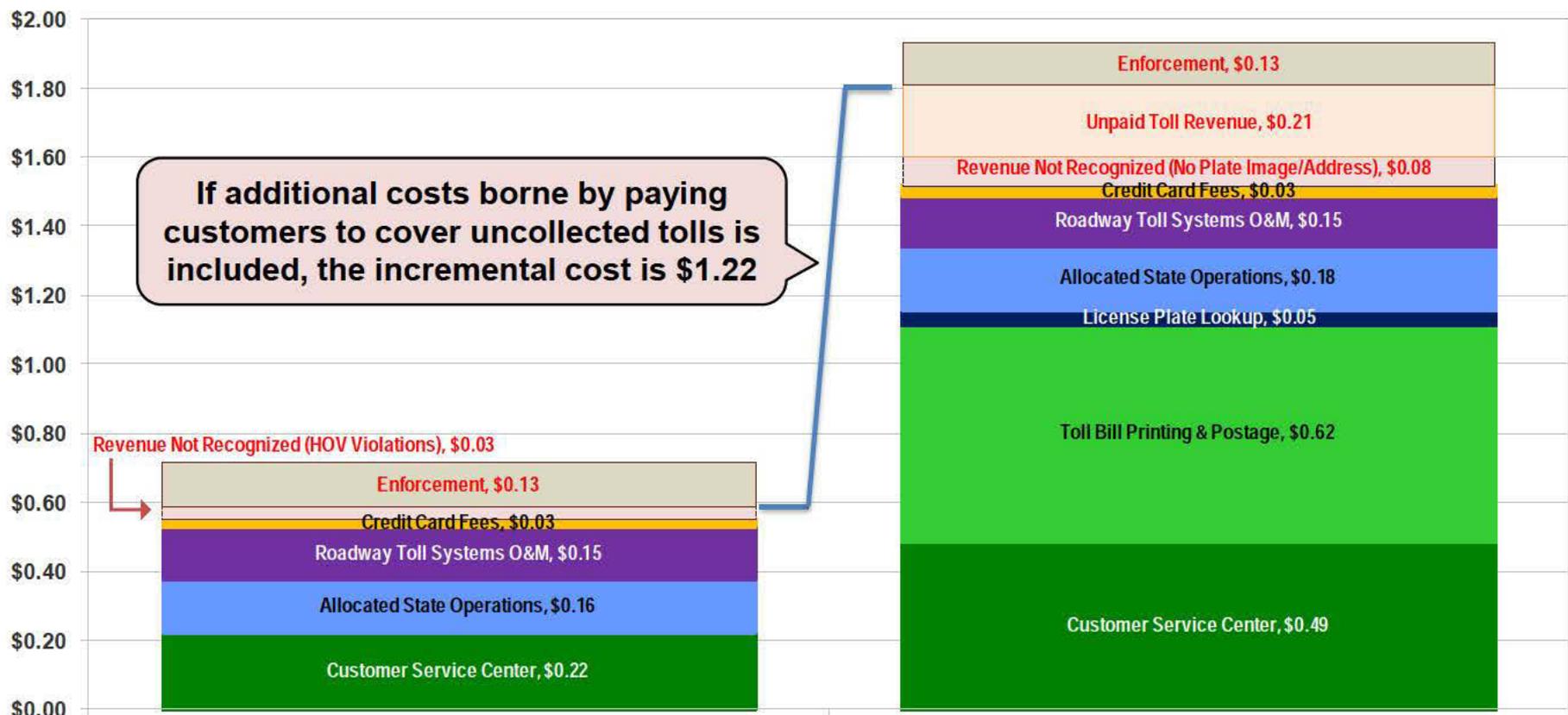
	FY 2017 - Good To Go! Transponder	Increment	FY 2017 - Pay By Mail
Toll Collection Costs	\$0.55	+ \$0.96	\$1.52
Above + Leakage	\$0.58	+ \$1.22	\$1.80
Above + Enforcement	\$0.71	+ \$1.22	\$1.93

Values in Year of Collection Dollars

# Pay By Mail Differential

## Projected Toll Collection Costs By Payment Method

3+ carpool free peak/2+ carpool free off-peak - FY 2017 Comparison



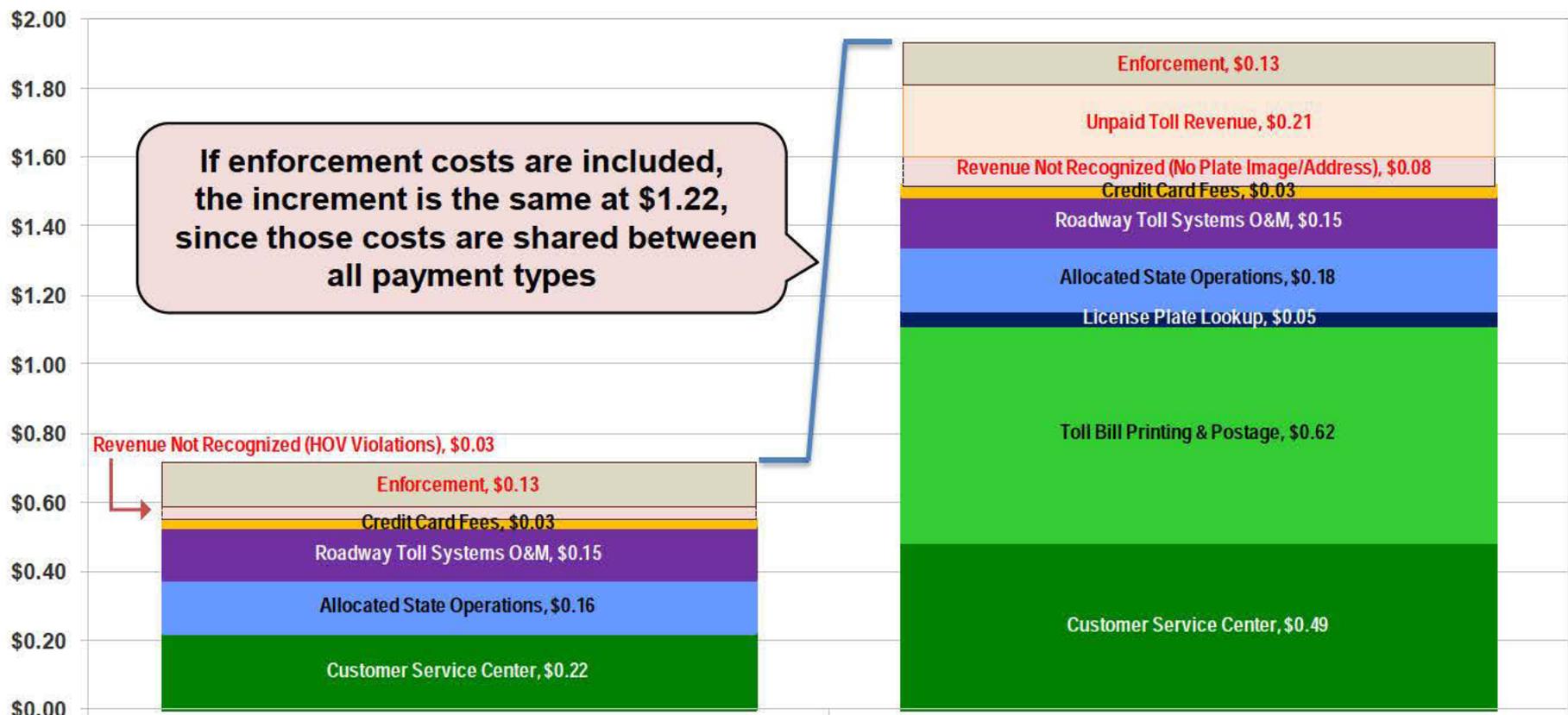
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Values in Year of Collection Dollars

# Pay By Mail Differential

## Projected Toll Collection Costs By Payment Method

3+ carpool free peak/2+ carpool free off-peak - FY 2017 Comparison



If enforcement costs are included, the increment is the same at \$1.22, since those costs are shared between all payment types

	FY 2017 - Good To Go! Transponder	Increment	FY 2017 - Pay By Mail
Toll Collection Costs	\$0.55	+ \$0.96	\$1.52
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Above + Enforcement	\$0.71	+ \$1.22	\$1.93

Values in Year of Collection Dollars

# Pay By Mail Differential Policy Options

- **Options could include:**
  - \$1.00 (covers cost increment only)
  - \$1.25 (covers incremental cost and losses)
  - \$1.70 (consistent with modeling and SR 520 in FY 2017 and beyond)
  - \$2.00 (consistent with Tacoma Narrows Bridge)
  - Others?
- **Considerations:**
  - Higher options will cover incremental costs for longer period
  - Higher options create greater incentive for users to get a pass
- **Planning assumption: \$1.70 Pay By Mail differential**

# Non-carpool Exemptions

- **Vehicles working on the facility are currently exempt on all toll facilities**
  - In-service maintenance and incident management vehicles
  - In-service emergency vehicles
  - On SR 520, tow trucks contracted for incident management
  - On I-405, would include WSP conducting HOV enforcement
- **Transit and Vanpools**
  - Exempt by statute
- **Private Buses**
  - Exempt on SR 520 by Urban Partnership agreement
  - RCW 46.61.165 allows private buses on “transit priority lanes”
- **Carpools and Motorcycles**
  - EAG recommends 3+ carpool free peak/2+ carpool free off-peak exemption
  - Motorcycle exemptions may be required under federal statute

# Exemptions

## National Examples

	Emergency Vehicles	Transit and Private Buses	Motorcycles
SR 91 Orange County, CA	Emergency vehicles toll-free	Information Unavailable	Motorcycle toll-free
I-495 Capital Beltway Virginia	Emergency vehicles toll-free with pass required	Transit toll-free with pass required Private buses toll-free with pass required	Motorcycles toll-free
I-95 Miami, FL	Emergency vehicles toll-free	Private buses toll-free with registration required	Motorcycles toll-free
I-85 Atlanta, GA	Emergency vehicles toll-free	Transit toll-free with registration required Private buses toll-free with registration required	Motorcycles toll-free
I-394 Minneapolis, MN	Emergency vehicles toll-free	Transit toll-free	Motorcycles toll-free
I-10/I-110, Los Angeles CA	In-service emergency vehicles toll-free	Transit and vanpools toll-free Private buses toll-free	Motorcycles toll-free

# Private Buses

**Privately-operated, regularly-scheduled routes are exempt from tolls on SR 520, a condition of the Lake Washington Urban Partnership agreement**

- **Considerations**

- Only affects tolls when operating without passengers (HOV otherwise)
- Consistency with other facilities
- Interpretation needed for RCW 46.61.165  
(allows private buses in transit priority lanes without passengers)

- **Policy Choices**

- Exempt private buses or do not exempt them
- Financial Analysis Assumption: Private buses treated as 3+ carpools

- **Planning Assumption: Private buses are exempt**

## Motorcycles

- **Considerations**
  - Washington HOV lanes allow motorcycles
  - SR 167 HOT lane exempts motorcycles from tolls
- **Policy Choices**
  - Exempt motorcycles
  - Do not exempt motorcycles
  - Financial Analysis Assumption: Motorcycles are exempt
- **Planning Assumption: Motorcycles exempt**

# Next Steps

- **At the February meeting, the Commission will propose:**
  - **Maximum toll rate**
  - **Minimum toll rate**
  - **Pay By Mail differential**
  - **Exemptions**
    - (Note – by statute, transit and vanpools must be exempt on I-405)*
      - Emergency vehicles / incident response / maintenance vehicles
      - Private buses
      - Motorcycles
      - Carpools (defined as 2+ or 3+ occupancy)
- **What additional information is needed?**

# For questions or further information...

Craig J. Stone, P.E.  
Assistant Secretary, Toll Division  
206-464-1222 or [StoneC@wsdot.wa.gov](mailto:StoneC@wsdot.wa.gov)