

I-95 CORRIDOR COALITION MILEAGE-BASED USER FEE STUDY

Addressing Out-of-State Mileage in a Mileage Based User Fee System

One of the focus areas of the I-95 Corridor Coalition’s Mileage-Based User Fee (MBUF) work is examining how travel across state boundaries would be handled with a MBUF approach. The Phase 1 activities conducted along the east coast highlighted the complications travel across multiple states would bring to a national MBUF system. This Technical Memorandum (Tech Memo) discusses the need to address out-of-state mileage in a multi-state mileage-based user fee (MBUF) approach. This memo has been prepared under Task 2.1 of the I-95 Corridor MBUF project funded under the U.S. Department of Transportation (US DOT) Surface Transportation Systems Funding Alternatives (STSFA) grant program.

The following sections and information are included in this document:

- **Out-of-state Miles Driven Within the I-95 Corridor Coalition States** – This section presents information on the how many miles are driven by residents of one state in other states, including statistics from the U.S. Census Bureau and the results of the Phase 1 MBUF Pilot.
- **The Need for Identifying Out-of-State Mileage in a MBUF System** – This section summarizes the importance of understanding OOS travel and the potential revenue impacts of shifting from a fuel tax to an MBUF approach.
- **Out-of-state mileage and Commercial Vehicles**—This section describes how heavy trucks fuel purchase location and location of mileage driven is currently being used to distribute transportation revenues.
- **Potential Mechanisms for Estimating Out-of-State Mileage** – Without a readily available source of OOS mileage, this section discusses approaches for estimating and identifying out-of-state mileage for passenger vehicles.

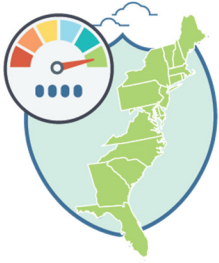
OUT-OF-STATE MILES DRIVEN WITHIN THE I-95 CORRIDOR COALITION STATES

The east coast provided the ideal environment to explore how traveling across multiple states would complicate a national MBUF approach. Given the relatively small geographic size of many states in the mid-Atlantic and the northeast, cross-state travel is common along the I-95 Corridor. Statistics from the U.S. Census Bureau bear this out (Table 1), indicating appreciable levels of work-related cross-state travel for several states within the Coalition.

Additionally, according to the 2015 Northeast Corridor Intercity Travel Study¹:

- More than 4 million person-trips are made annually by car between the Washington, D.C. / Baltimore, Maryland area and the Philadelphia, Pennsylvania area. Undoubtedly, many, if not most, of those trips go through Maryland, Delaware, and Pennsylvania (and possibly Virginia and New Jersey).

¹ Northeast Corridor Commission, 2015



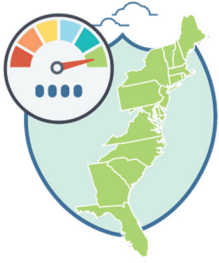
I-95 CORRIDOR COALITION MILEAGE-BASED USER FEE STUDY

- More than 9 million person-trips are made annually by car between the Philadelphia, Pennsylvania area and New York City. Undoubtedly, most of those trips go through Pennsylvania, New Jersey, and New York.
- More than 6.5 million person-trips are made annually by car between the New York City and the greater Boston, Massachusetts / Providence, Rhode Island areas. Undoubtedly, most of those trips go through New York, Connecticut, Rhode Island, and Massachusetts.

Table 1. Work-Related Cross State Travel in the I-95 Corridor

State	Workers Living in State; Working in Another State	Workers Working in State; Living in Another State
Maine	4.7 %	1.8 %
New Hampshire	17.0 %	10.8 %
Vermont	7.2 %	7.1 %
Massachusetts	4.5 %	6.3 %
Rhode Island	15.6 %	12.8 %
Connecticut	6.4 %	6.4 %
New York	2.8 %	6.4 %
New Jersey	14.0 %	7.8 %
Pennsylvania	5.4 %	4.6 %
Delaware	16.4 %	14.8 %
Maryland	18.3 %	9.1 %
District of Columbia	25.2 %	72.4 %
Virginia	9.5 %	6.8 %
North Carolina	2.5 %	2.6 %
South Carolina	5.1 %	3.6 %
Georgia	3.0 %	3.0 %
Florida	1.2 %	0.7 %

Source: 2011 Census



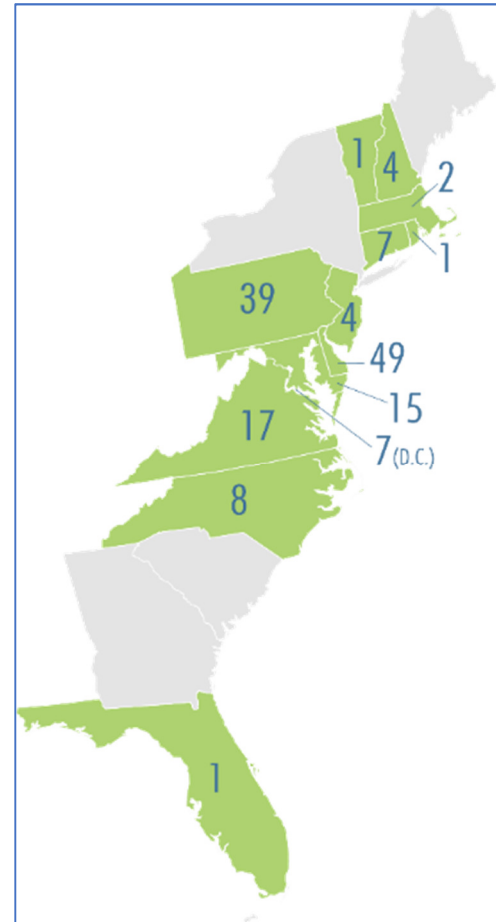
I-95 CORRIDOR COALITION MILEAGE-BASED USER FEE STUDY

Results from the Phase 1 MBUF Pilot

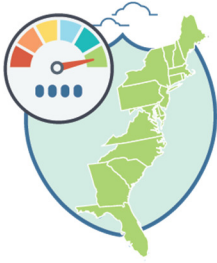
The Phase 1 MBUF Pilot provided additional evidence of the notable amount of out-of-state mileage along the eastern seaboard. The pilot included 155 participants from 13 of the 17 coalition states as shown on Figure 1. Two location-based mileage reporting options were available to participants – a plug-in device (to the vehicle’s on-board diagnostics [OBD]-II port) and a smartphone app (android phones only). The plug-in device measured mileage using vehicle data, with the location capability being used to differentiate mileage by state. The smartphone approach used the phone global positioning system (GPS) to calculate mileage and differentiate where the mileage occurred. Of the 459,448 total miles driven by vehicles with the location-based MBUF during the pilot, more than 20% on average were outside the participant’s home state as shown on Figure 2.

These vehicles were charged² the MBUF per-mile rate (less the state gas tax) for each state they drove in. A MBUF rate was calculated for each state, based on the state’s gas tax, to be “revenue neutral” – that is, the difference between MBUF and gas tax paid would be zero for a vehicle getting the national average of 22 MPG. As an example calculation of this revenue neutral rate, a Delaware vehicle averaging 22 MPG and driving 1000 miles (all in Delaware) will use $1000 \text{ mi} / 22 \text{ mpg} = 45.45$ gallons of gas, paying $45.45 * \$0.23 \text{ cents per gallon} = \10.45 in Delaware state gas tax. This equates to $\$10.45 / 1000 \text{ mi} = 1.05$ cents per mile (with rounding).

Figure 1. Number of Pilot Participants by Coalition State

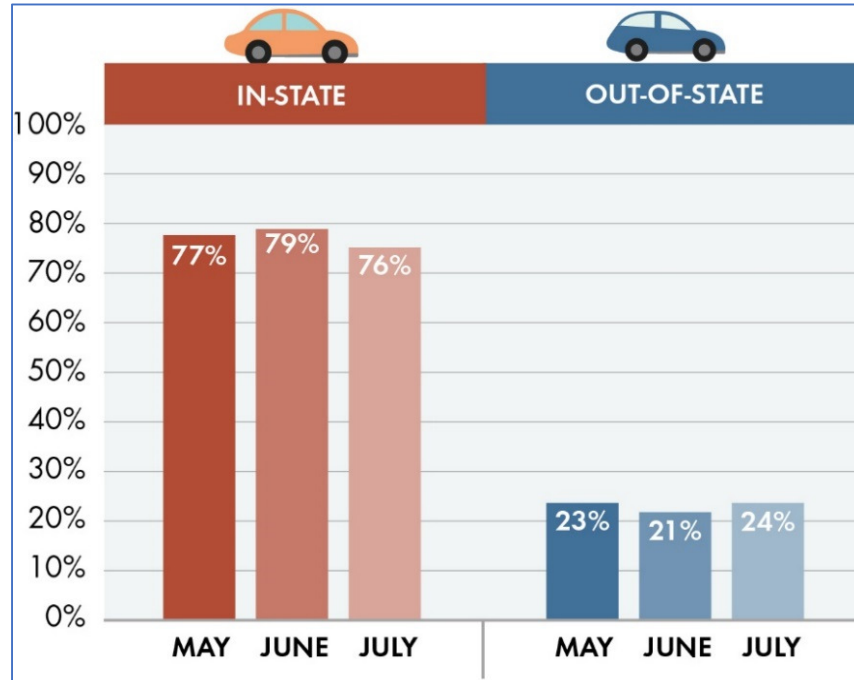


² All charges were simulated. No actual funds were involved.



I-95 CORRIDOR COALITION MILEAGE-BASED USER FEE STUDY

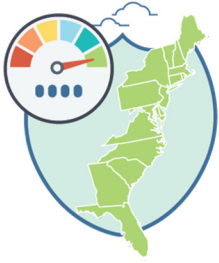
**Figure 2. Out-of-State Mileage by Month
(Location-Based Approaches)**



During the Phase 1 pilot, those participants with a location-based device would receive a monthly statement that specified the number of miles driven in each state and the MBUF that would potentially be charged (in lieu of a fuel tax). As an example, consider a vehicle registered in Delaware with an average miles per gallon (MPG) of 30 that was driven 1500 miles in 1 month, with 1000 of those miles driven in Delaware (with an MBUF rate of 1.05 cents/mile and a 23 cents/gallon state gas tax) and the remaining 500 miles driven in Pennsylvania (with a MBUF rate of 2.65 cents/mile and a 58.2 cents/gallon state gas tax). The net MBUF was calculated as shown in Table 2.

Table 2. Charges from an Example Vehicle Trip with Plug-in Device

Location	MBUF Charge	Gas Tax Credit	Net Charge
Delaware	$1000 \times 0.0105 = \$10.50$	$(1000/30) \times 0.23 = \7.67	\$2.83
Pennsylvania	$500 \times 0.0265 = \$13.25$	$(500/30) \times 0.582 = \9.70	\$3.55
Total	\$23.75	\$17.37	\$6.38



I-95 CORRIDOR COALITION MILEAGE-BASED USER FEE STUDY

THE NEED FOR IDENTIFYING OUT-OF-STATE MILEAGE IN A MBUF SYSTEM

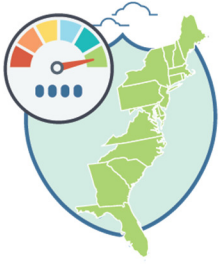
States only collect fuel taxes when passenger vehicles and trucks purchase fuel within their state borders, not based on the miles driven (aka “use”) on a state’s transportation system. In other words, if a driver purchases a tank of gas in northern Delaware and then proceeds to cross the state line and mainly drive in Pennsylvania, only Delaware will receive gas tax revenue, with Pennsylvania roads accruing most of the mileage and associated congestion and wear and tear. A fundamental shift that MBUF would create is linking transportation system revenue to the actual use of the roads versus where fuel was purchased.

To get a better understanding of how a shift from fuel tax to MBUF would affect DOT revenues, the Phase 1 study included a high-level financial analysis comparing projected MBUF revenues under the following two scenarios:

- **Baseline** - All mileage driven by the residents of a particular state is charged that state’s MBUF rate (less the state’s gas tax credit), regardless of which state the residents actually drive in, with the net MBUF going to the state.
- **Incorporating Out-of-State Mileage** -- All mileage driven in a particular state – regardless of the drivers’ residences – is charged that state’s MBUF pilot rate (less gas tax credit), with the net MBUF for all drivers accruing mileage in the state going to that state. Mileage driven outside the state by the state’s residents is not charged that state’s MBUF (although such mileage is charged the MBUF rate in those other states where they drive.)

The data inputs for the analysis are shown in Table 3. With respect to total mileage and out-of-state mileage, these values were based on the Phase 1 results as follows:

- **Total mileage** – Average miles driven per month per state participant (during pilot) expanded based on 12 months (annual) and number of registered vehicles in state
- **Delaware** – Pilot participants from DE drove 18% of their mileage outside of Delaware. Pilot participants from other states (i.e., residents of adjacent states – MD, PA, NJ) drove 2 – 3 % of their miles in DE. These pilot values were extrapolated into annual totals based on average miles driven by these other state residents (per month per participant) and the number of registered vehicles in each of the three states (recognizing that other miles potentially driven in DE from other states was not included in the expanded total).
- **Pennsylvania** – Pilot participants from PA drove 12% of their mileage outside of Pennsylvania. Pilot participants from other states (i.e., residents of adjacent states – MD, DE, NJ) drove 1 – 3.5 % of their miles in PA. These pilot values were extrapolated into annual totals based on average miles driven by these other state residents (per month per participant) and the number of registered vehicles in each of the three states (recognizing



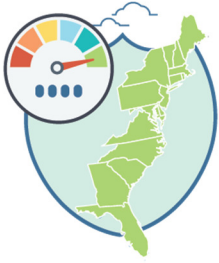
I-95 CORRIDOR COALITION MILEAGE-BASED USER FEE STUDY

that other miles potentially driven in DE from other states was not included in the expanded total).

Table 3. Inputs for Estimating State Transportation Revenues

Input	Delaware	Pennsylvania	Source
Registered Light-Duty Vehicles	935,000	9,772,982	FHWA, DMVs
Total Annual Mileage by State Residents	14.7 Billion	124.4 Billion	Phase 1 Pilot Data – Expanded based on number of registered vehicles
Average Fuel Efficiency	22 mpg	22 mpg	National Average
State Gas Tax	23¢ / gallon	58.2¢ / gallon	Actual in 2018
Per-Mile Rate	1.05 ¢ / mile	2.65 ¢ / mile	Revenue Neutral – Calculated Based on State Gas Tax
Annual Increase in Mileage	1.2%	1.2 %	FHWA VMT projections (thru 2036)
Annual mileage driven by state residents in other states	2.6 Billion (18% of total mileage)	14.9 Billion (12 % of total mileage)	Phase 1 Pilot Data – Expanded
Annual mileage driven in the state by out-of-state residents	6.7 Billion	5.0 Billion	Phase 1 Pilot Data – Expanded based on out-of-state mileage driven by pilot participants from adjacent states

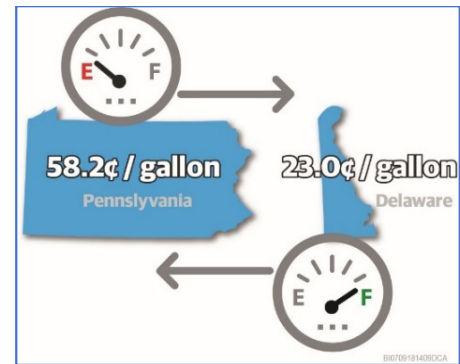
The results of the financial analysis indicated that if MBUF was based on actual miles driven in the state (versus the baseline scenario of the total number of miles Delawareans drive), Delaware would have a net gain in revenue because the state would receive more MBUF from out-of-state residents than Delaware drivers pay to other states. On the other hand, Pennsylvania would become a net revenue loser because the Phase 1 Pilot results indicated that Pennsylvania residents drive more miles out-of-state as compared to the miles driven in Pennsylvania by out-of-state residents. Given that this comparison is based on a small number of pilot participants, the actual share and totals of in vs. out-of-state mileage may be different from the inputs used in the analysis. Nevertheless, the simple analysis highlighted that how MBUF is implemented could result in some states becoming net gainers in revenue, while other states could become net revenue losers from a MBUF system, depending on the levels of out-of-state mileage.



I-95 CORRIDOR COALITION MILEAGE-BASED USER FEE STUDY

In addition, another key piece of information is missing from this analysis—where drivers are purchasing fuel. Take for example Figure 3, which shows the discrepancy between Pennsylvania and Delaware state gas taxes at the time of the Phase 1 pilot. It may very well be that a significant number of residents of southeast Pennsylvania accrue most of their mileage in Pennsylvania, except for a few miles in Delaware to purchase gas given that the Delaware gas tax is much less than Pennsylvania’s state gas tax. This financial incentive would be eliminated in an MBUF situation potentially creating a revenue losing situation in Delaware.

Figure 3. Gas Tax Difference Between Pennsylvania and



OUT-OF-STATE MILEAGE AND COMMERCIAL VEHICLES

The concept of distributing transportation revenues based on where vehicles drive and how much mileage they accrue in each state is currently used for various commercial vehicles via the International Fuel Tax Agreement (IFTA) and the International Registration Plan (IRP), as briefly described below:

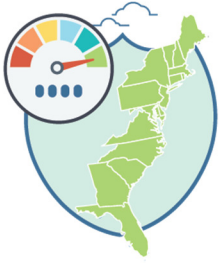
- **IFTA** is a program for redistributing state fuel taxes between states, based on the number of miles driven and fuel purchased in each state by interstate trucks greater than 26,000 pounds gross registered weight and all trucks with three or more axles.
- **IRP** is a program for distributing state registration fees between states based on the mileage driven in each state. IRP applies to commercial vehicles of 26,000-pound gross registered weight or above and vehicles with three or more axles, operating interstate. Vehicles of lesser weight may also be included (unlike IFTA).

As such, out-of-state mileage is already being collected for interstate commercial vehicles. In Phase 2, the possibility of using IFTA and / or IRP as a framework for MBUF on commercial vehicles, as well as using the cross-state mileage data for estimating out-of-state mileage, will be further examined.

POTENTIAL MECHANISMS FOR ESTIMATING OUT-OF-STATE MILEAGE

Road User Charge West Study of Interstate Mileage

While the I-95 Corridor Coalition Phase 1 project was the first to directly and fully address out-of-state mileage in a pilot demonstration, and then to use these data to address the potential financial impacts of incorporating out-of-state mileage in a MBUF system, Road User Charge (RUC) West published a report in 2014 entitled “Study of Inter-Jurisdictional Road Usage Charge Issues.” It is noted that the Census data of out-of-state workers (Table 4 as compared to



I-95 CORRIDOR COALITION MILEAGE-BASED USER FEE STUDY

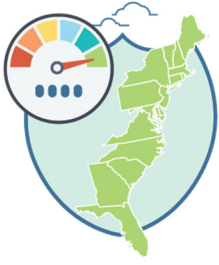
Table 1) indicate that western states have much less out-of-state mileage as compared to most east coast states, no doubt due to the fact that the western states are much larger than their east coast counterparts, and most of the major urban areas are not near state lines. There are a few exceptions to this, such as Portland, OR and Vancouver, WA, which are separated by the Columbia River (the state line).

Table 4. RUC West States Work-Related Cross State Travel

State	Workers Living in State; Working in Another State	Workers Working in State; Living in Another State
Idaho	6.1 %	2.7 %
Wyoming	2.8 %	5.2 %
Washington	3.6 %	2.0 %
Oregon	2.4 %	5.2 %
New Mexico	3.0 %	2.7 %
Nevada	2.2 %	2.7 %
Colorado	1.5 %	1.5 %
California	0.5 %	0.5 %

Source: 2010 Census

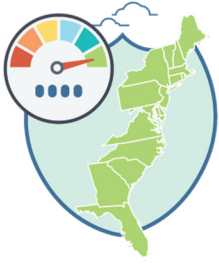
The RUC West study developed and assessed several approaches for including out-of-state miles in a MBUF system, as summarized in Table 5. The information for the “Approach” and “Advantages / Disadvantages” columns is taken from the Report. “Comments” are based on the Coalition’s Phase 1 analyses and results. Other approaches addressed in the RUC West report are combinations of the approaches identified in Table 5, each with the same advantages and disadvantages of their composite approaches. One of these combined approaches, **distance-based, with estimated charges**, where “a state would impose a distance-based charge on vehicles equipped with electronic distance and location reporting capabilities but use estimated charging for vehicles that opted for manual or non-location-based distance reporting in their states”. Such an approach – **estimating** the level of out-of-state mileage for those vehicles that were not equipped with location-based mileage reporting, was used in the Phase 1 Pilot, the first pilot to demonstrate such an approach as described below.



I-95 CORRIDOR COALITION MILEAGE-BASED USER FEE STUDY

Table 5. Approaches for Including Out-of-state Miles in MBUF (RUC West)

Approach	Advantages / Disadvantages	Comments
<p>No charge – a state doesn’t charge out-of-state drivers MBUF.</p>	<p>No additional administration costs, but visitors would not be contributing revenues despite imposing roadway “costs,” creating an imbalance in tax treatment between residents and visitors.</p>	<p>An argument for MBUF is that it can ensure out-of-state drivers help pay for the roads that they are using (a contribution that would not be captured if a vehicle does not purchase fuel). Statewide surveys in PA and DE indicated concern (52%) that “out-of-state drivers may end up not paying” MBUF.</p>
<p>Estimated charge – a state does not directly charge visitors MBUF but estimates their usage as the basis for reconciliations of funds collected by the visitor’s home state.</p>	<p>Addresses some of the disadvantages of a “no charge” approach. Requires reliable data on out-of-state travel between states, and states would have to develop reconciliation agreements using these data.</p>	<p>This approach was used in the Phase 1 Pilot for vehicles that did not choose a location-based mileage reporting option. This is discussed in the next section.</p>
<p>Charge based on fuel consumption – a state imposes a tax on fuel purchased by visitors (which may or may not apply to residents)</p>	<p>Visitors are already doing this when they purchase fuel in another state. For visitors who do purchase fuel, this method does not address the inequity between highly fuel-efficient vehicles (e.g. hybrid-electric) and other vehicles, which is one of the drivers behind implementing an MBUF system.</p>	<p>This may lead to inequities if adjacent states have significantly different fuel tax rates.</p> <p>Imposing an additional fuel tax on visitors would be very difficult to administer and enforce. The fuel tax revenues that go to the state are not collected at the pump – it is collected at the bulk or distributor level. The report does not indicate how this would be enforced with self-serve gas pumps (perhaps based on the address of the credit card used).</p>



I-95 CORRIDOR COALITION MILEAGE-BASED USER FEE STUDY

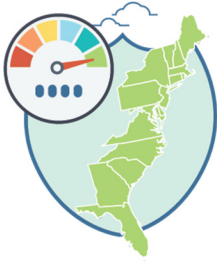
Table 5. Approaches for Including Out-of-state Miles in MBUF (RUC West)

Approach	Advantages / Disadvantages	Comments
Charge based on time – host jurisdiction imposes a charge on visitors based on the amount of time they access the host roadway network.	Several disadvantages – A state would have to create and operate a time permitting system alone or in combination with other states. Numerous evasion opportunities would exist, so enforcement would need to be planned and implemented carefully.	The report indicates this system would be “relatively cost effective to administer.” This statement seems to be in error – setting up the system, the process of selling permits to out-of-state drivers, and then the subsequent enforcement activities would likely be very costly.
Charge based on distance – a state imposes a charge on visitors based on the distance they travel on the state’s roadway network.	A major advantage is that the tax is based on the actual distance travelled in a state, thereby resolving the constitutional issue of different treatment of residents versus visitors. It also removes any revenue distortions such as those associated with fuel taxes and time-based charges discussed previously. A major disadvantage is that all visitors must have a location-based distance reporting method.	This approach was used in the Phase 1 Pilot for those participants that chose a location-based mileage reporting option.

Data for Estimated Charges – Phase 1 Pilot

A major issue with the estimated charge approach (for drivers without a location-based MBUF approach) is obtaining information on which to base the development of these estimated charges and rates. Currently, there is no detailed source of data for the number of miles driven in each state by out-of-state residents.

For the Phase 1 Pilot, the estimated charges were developed based on the Census data on out-of-state workers as shown in Table 1, coupled with a review of maps, with the out-of-state MBUF rates and gas tax credits based on the rates and taxes in contiguous states. The assumed percentages of out-of-state travel, and the associated MBUF rates and gas tax credits used in the Phase 1 Pilot are shown in Table 6. **These assumptions and estimated rates were only applied to vehicles that did not have a location-based mileage reporting device.** For a vehicle registered in Delaware driving 1,500 miles in 1 month (and getting 30 MPG), the resulting MBUF charge would be calculated as shown in Table 7.



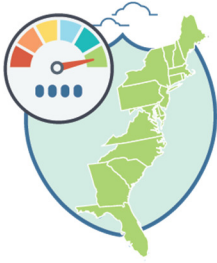
I-95 CORRIDOR COALITION MILEAGE-BASED USER FEE STUDY

Table 6. Assumed Percentages of Out-of-State Mileage by In-State Vehicles and Associated Out-of-state Per-Mile Rates and Gas Taxes Used During Phase 1 MBUF Pilot

State	Out-of-state Mileage by Resident Drivers	Out-of-state Per Mile Rate (cents per mile)	Out-of-state Gas Tax Credit (cents per gallon)	Out-of-state Rates and Gas Taxes Based On
Connecticut	8 %	1.69	37.08	NY (50%), RI, MA
Delaware	18 %	2.13	46.75	PA (50%), NJ, MD
District of Columbia	30 %	1.27	27.95	VA, MD
Florida	1 %	1.41	31.09	GA
Georgia	3 %	1.22	26.78	SC, FL
Maine	5 %	1.15	25.19	NH, MA
Maryland	20%	1.29	28.24	DC (35%), VA (35%), PA, DE
Massachusetts	5 %	1.61	35.39	CT, NH, RI, NY
New Hampshire	18 %	1.29	28.39	MA (50%), VT, ME
New Jersey	15 %	2.32	51.04	NY, PA
New York	4 %	1.75	38.48	NJ, CT
North Carolina	3 %	0.89	19.57	VA, SC
Pennsylvania	6 %	1.56	34.37	DE, MD, NJ, NY
Rhode Island	16 %	1.59	34.93	CT, MA
South Carolina	5 %	1.49	32.82	GA, NC
Vermont	8 %	1.54	33.86	NH, NY
Virginia	10 %	1.30	28.50	DC, MD

Table 7. Estimated Charges for a Vehicle Without Location-Based Mileage Reporting

With No Location	MBUF Charge	Gas Tax Credit	Net Charge
Delaware (82 %)	$1230 \times 0.0105 = \$12.92$	$(1230/30) \times 0.23 = \9.43	\$3.49
Other states (18 %)	$270 \times 0.0213 = \$5.75$	$(270/30) \times 0.4675 = \4.21	\$1.54
Total	\$18.67	\$13.64	\$5.03



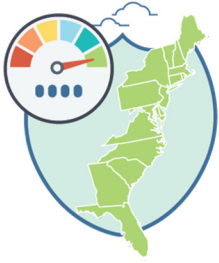
I-95 CORRIDOR COALITION MILEAGE-BASED USER FEE STUDY

Table 8 presents a comparison of the assumed out-of-state mileage to the actual out-of-state mileage (based on the data from participants with location-based approaches) for residents of Delaware, Pennsylvania, Virginia, and Maryland, the four states with the highest number of participants in the Phase 1 Pilot. These four states included approximately 78% of pilot participants.

Table 8. Comparison of Assumed versus Actual Out-of-State Mileage

State	Number of Participants	States the Out-of-State Rates and Gas Taxes are Based On	Assumed Out-of-State Mileage	Actual Out-of-State Mileage*
Delaware	49	Combined	18%	18%
		<i>Pennsylvania</i>	50%	25%
		<i>New Jersey</i>	25%	18%
		<i>Maryland</i>	25%	48%
		<i>Other</i>	0%	9%
Maryland	15	Combined	20%	34%
		<i>District of Columbia</i>	35%	31%
		<i>Virginia</i>	35%	42%
		<i>Pennsylvania</i>	15%	3%
		<i>Delaware</i>	15%	5%
		<i>Other</i>	0%	19%
Pennsylvania	39	Combined	6%	12%
		<i>Delaware</i>	25%	15%
		<i>Maryland</i>	25%	31%
		<i>New Jersey</i>	25%	25%
		<i>New York</i>	25%	5%
		<i>Other</i>	0%	24%
Virginia	17	Combined	10%	33%
		<i>District of Columbia</i>	50%	16%
		<i>Maryland</i>	50%	30%
		<i>Other</i>	0%	54%

*Averaged over the 3 months



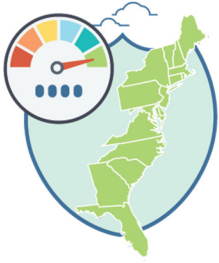
I-95 CORRIDOR COALITION MILEAGE-BASED USER FEE STUDY

There are differences – often-times quite large – between the assumed percentages in Table 6 and the actual percentages as shown in Table 8. This is not surprising given that the assumed combined percentage were based on Census data of percent of out-of-state workers, and the distribution among the contiguous states was primarily based on a review of maps and the roadway network. Additionally, no mileage was assumed beyond the contiguous states, a somewhat unrealistic view particularly the during the summer vacation months. Another important consideration is that the sample sizes (i.e., the number of participants in each state) is very small. Moreover, the distribution of the sample within each state probably does not match reality, particularly in terms of where individuals live in the state and how close they are to a state line. All the above considerations notwithstanding, the Phase 1 Pilot did demonstrate that such an “estimated charge” approach for distributing MBUF between states for drivers who do not use location-based mileage reporting is valid. What is necessary are more accurate percentages reflecting out-of-state mileage.

Potential Sources of Out-of-state Data

To maximize fairness and equity between states and the interstate transfer of MBUF funds, and the need for each state to agree to the proposed charges and transfer percentages, the estimated charge approach and the associated rates must be based on accurate information on the number of miles driven in each state by out-of-state residents. While no detailed source of such data exists, there are several potential sources for estimating this information as summarized below:

- **Census Data** – While used to develop percentages of out-of-state travel and the associated per-mile rates and gas tax credits for the Phase 1 MBUF Pilot, census data on the percentages of workers living in a state but working in another state, and the percentages of workers working in a state and living in another state, is not a long-term solution. Much of the necessary information is missing – the “another states” are not identified (the Phase 1 Pilot assumed that they were the contiguous states). And while the percentages provide a reasonable surrogate for the overall level of out-of-state travel, no information is provided regarding the actual number of miles driven by these out-of-state workers. Moreover, the census information is obtained once every 10 years and could conceivably become out of date.
- **IFTA and IRP Data** – As previously discussed, IFTA and IRP include detailed data on the levels of out-of-state mileage for interstate commercial vehicles (i.e., trucks greater than 28,000 pounds gross registered vehicle weight). The problem is that the travel patterns of light duty passenger vehicles are likely very different than those for interstate trucks. For example, based on the first quarter of data from the Phase 2 multi-state truck pilot, the 59 trucks in the pilot on average drove over half of their miles in states other than their base jurisdiction (i.e. home state) with these trucks cumulatively driving in 28 states. The out-of-the state mileage for the trucks from one of the carriers was greater than 75%. Such is the



I-95 CORRIDOR COALITION MILEAGE-BASED USER FEE STUDY

nature of interstate commercial trucking, but it does not reflect the out-of-state driving habits of most drivers of light duty vehicles.

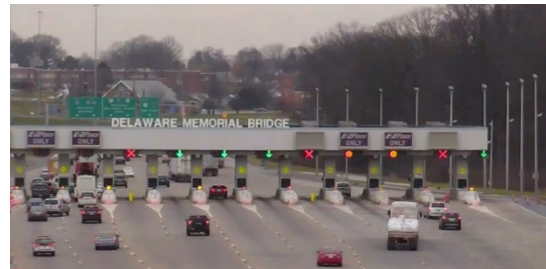
- **Tolling Data** – Most of the Corridor Coalition member states have toll facilities, many of which are major through routes in these states.

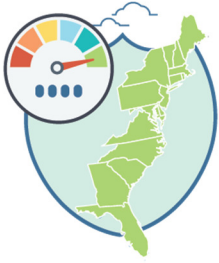
Additionally, several toll plazas are located near state lines (e.g., I-95 entering Delaware from New Jersey (Figure 4), I-95 in Delaware, New Jersey Turnpike termini near the Delaware, New York State, and Pennsylvania state lines, the Pennsylvania Turnpike entering New Jersey, and several tolled river crossings from New Jersey into New York City and between New Jersey and the greater Philadelphia area. In theory, some indication of cross-state mileage could be obtained from E-ZPass records. For example, the number of vehicles who pay a toll (particularly at a plaza near a state line) in one state using an E-ZPass account from a toll agency in another state, coupled with the number of miles they drove along the toll facility.

There are some potential drawbacks with this approach, such as the information would represent only a sample, and likely would not be appropriate for all states (e.g., those that have few or no toll facilities. Moreover, the sample would likely be heavily weighted towards interstate traffic (i.e., toll facilities are typically located on such routes) and not represent the true levels of cross-state mileage. Another potential issue is that (per discussions with tolling stakeholders), a driver's E-ZPass account may be with a tolling entity that is not their state of residence. For example, the CH2M Project Manager opened an E-ZPass account with the New York State Thruway while living in Connecticut, and has subsequently moved to Virginia, still receiving statements from the New York customer service center. Such detail on the addresses of account holders could be obtained, but would likely be a costly endeavor, not to mention bringing up potential privacy issues.

- **Private Entities and Probe Data** – Several private entities provide traveler information through the Internet and Smartphone apps. This information is obtained using a combination of DOT information (collected by state surveillance systems) plus vehicle probe data (e.g., vehicles using the app with the phone's GPS turned on and/or commercial vehicles under an arrangement with the private entity). This information is essentially anonymous, in that the traveler information service provider does not know the identification of the driver or the home state of the vehicle. That said, based on a discussion with one of the providers – INRIX – they are working on an application that would examine all the probe data and identify common areas of origins and destinations (O-D) of trips, thereby being able to provide the associated O-D data to DOTs for their planning purposes.

Figure 4. Toll Plaza on I-95 Entering Delaware





I-95 CORRIDOR COALITION MILEAGE-BASED USER FEE STUDY

If successful, this data could conceivably provide a useful measure of the out-of-state mileage. It is an approach to consider for the future.

- **Data from Location-Based Mileage Reporting Devices** – Perhaps the best source of out-of-state mileage data for developing the necessary estimated charge parameters is the information provided by MBUF users that choose a location-based approach for recording mileage. As previously noted, the sample size of the Phase 1 pilot was much too small to develop such parameters; but a mandated MBUF system would provide a very large (and likely statistically accurate) number and distribution of participants for developing these parameters. Moreover, it might be feasible to have different estimated charge parameters for different times of the year, reflecting changes in the levels of out-of-state mileage during vacation periods. The greater number of drivers that choose a location-based device, the greater the accuracy of the information. In the Phase 1 Pilot, 84% of the participants chose a location-based approach, but this is the highest percentage of any pilot to date. In the 2016-2017 California Road Charge Pilot Program, nearly 72% of the participants chose a location-based approach. Only 40% chose a location-based approach in the 2017-2018 Washington pilot.

Basing the estimated out-of-state parameters on data collected from vehicles using a location-based approach appears to be the optimum approach. To maximize the number of drivers who choose such a mileage reporting option, and therefore increase the accuracy of the data, it may be necessary to offer incentives connected with location-based approaches, such as enhance value-added services and/or reduced per-mile rates in some instances (e.g., toll roads), coupled with rigid privacy and data security requirements, and the associated education and outreach effort.