

## **6. COST DRIVERS AND PRELIMINARY COST ESTIMATES FOR VMT-BASED CHARGES ADMINISTRATIVE REQUIREMENTS**

### **Introduction and Summary of Approach**

This memorandum identifies the cost drivers which will impact on the costs for meeting the institutional and administrative requirements for implementing multistate VMT-based charges, and includes preliminary estimates of the potential administrative costs of vmt-based charges. It briefly relates, when appropriate, those cost drivers for those administrative and institutional requirements to the three system implementation options. However, some but not all of the cost drivers are somewhat independent of the options.

The cost drivers for administrative requirements will not necessarily include all costs such as the unit costs of the technologies that will need to be placed on the vehicles. As with other aspects of the technologies, this memorandum acknowledges those costs and provides references to other research which is addressing these other costs such as technologies and equipment.

There is significant helpful research on costs underway including Battelle's research under NCHRP project 19-08 on the costs of alternative revenue systems, for which two preliminary task reports have been shared recently with the I-95 Corridor Coalition effort. The NCHRP 19-08 information has not yet been finalized and released by NCHRP. However, the data assembled for NCHRP 19-08 on projected vmt administrative costs for the Netherlands are utilized here to help to inform the preliminary cost estimates for administration which are made for the Coalition's work.

The Netherlands invited bids from responsible companies to implement comprehensive VMT-based charges. Because there are no VMT-based charges now in place for general purpose traffic, the bids from the Netherlands represent the best current approximation of the costs of implementing such charges. All of the information presented here about Netherlands costs was compiled by Battelle for the NCHRP 19-08 task reports. The Netherlands implementation is currently on hold, pending government decisions about whether or not to proceed. As demonstration trials proceed in the United States or in other countries, more evidence on the costs of VMT-based charges will become available.

The Battelle NCHRP 19-08 final report may ultimately recommend other cost estimates for administrative requirements as part of its comprehensive estimates of the costs of VMT-based charges. A final report of the NCHRP report is expected around the time of the Coalition's presentation of the results of our institutional, administrative and legal work, scheduled for June 2010. It is not known whether NCHRP 19-08 will be complete and published at that time.

**Summary of approach** - It is not possible for the Coalition's efforts in this research to create a strict "unit cost model" or other specific cost model for cost drivers, because the costs will not be linearly dependent on units. In addition, most current cost data from various revenue systems is fairly aggregate, and applies as well to different types of revenue sources than vmt charges. Thus, the approach to estimating costs includes a great deal of judgment and acknowledges a substantial amount of uncertainty. The experience cited in the initial two NCHRP report documents, and our identification of cost drivers, is intended to provide as solid a basis as is now possible for making judgmental cost estimates. Items missing from the administrative costs presented in this memo include the costs of the technology and the costs of setting up the systems, which are addressed in the NCHRP 19-08 project and in other research.

### **Our Previous Compilations of Current Administrative Costs for Motor Fuel Taxes**

Technical memorandum one compiled the available data from FHWA's Highway Statistics publications on the administrative or collection costs of motor fuel taxes and registration fees in the Coalition states. The administrative costs of motor fuel taxes are relatively low in total costs in comparison to the revenues that the states accrue. At the national level, an average of 0.82 percent of motor fuel tax receipts have been used for administrative or collection expenses over the past decade, based on information compiled from FHWA's annual reports of Highway Statistics. The figure is comparable for Coalition states, at an estimated level of 0.86 percent. In looking at the data for the individual states, however, this percentage fluctuates between 0.36 percent (Rhode Island) and 1.40 percent (North Carolina), although the median is estimated at 0.93 percent. Variations are not particularly meaningful, due to the different ways in which states may accumulate and report administrative costs.

The NCHRP 19-08 report has compiled some information on these costs from Highway Statistics and has also asked specific states for additional more detailed data on their motor fuel tax administrative costs. All of this information indicates very consistently that the administrative costs of motor fuel taxes are very low in relation to the revenues collected. While cost is definitely not the only important factor in comparing potential VMT-based fees to motor fuel taxes, it will certainly receive attention in deliberations over future revenue sources in the states and at the federal level.

### **Current Administrative Costs for Vehicle Registration Fees**

The percentage of motor vehicle receipts that are used for collection expenses and the average cost per vehicle of collection expenses for registration fees were presented in the task 1 memo using data from FHWA Highway Statistics tables for the period 1997

to 2007. At the aggregate national level (for all states combined) and in the Coalition member states, 11.0 percent and 12.8 percent of the motor vehicle receipts are used for collection expenses, respectively, at a cost of almost \$13 per vehicle at the national level, and almost \$12 per vehicle for Coalition member states. Again, the share of revenues used for collection expenses and the cost per vehicle fluctuates across Coalition member states. For instance, in Delaware, less than 4 percent of the motor vehicle receipts pay for collection expenses, compared to over 27 percent in South Carolina. These fluctuations are again due to both differing requirements, such as for vehicle inspections, and the differing protocols used in reporting the administrative costs. In some states, localities perform some of these functions, so costs are not comparable to those of other states. The NCHRP 19-08 report did not compile the administrative costs for registration fees, since their focus was on alternatives to motor fuel taxes. Table 1 shows the administrative costs of registration fees for the Coalition states in relation to registration revenues and in relation to the numbers of vehicles.

**Table 1: Collection Costs as a Percentage of Total Receipts for Motor Fuel Taxes and Motor Vehicle Fees, and Cost of Motor Vehicle Fee Collection per Registered Vehicle (1997-2007)**

<b>States</b>	<b>Admin - MFT</b>	<b>Admin -</b>	
		<b>Veh Reg</b>	<b>\$/Veh Reg</b>
Connecticut	0.95%	16.35%	\$ 16.30
Delaware	1.10%	3.96%	\$ 5.79
Dist Col		12.01%	\$ 40.99
Florida	1.13%	7.34%	\$ 5.72
Georgia	1.07%	20.89%	\$ 8.85
Maine	0.38%	26.81%	\$ 22.49
Maryland	0.89%	13.76%	\$ 34.55
Massachusetts	0.90%	14.84%	\$ 9.12
New Hampshire	0.49%	17.52%	\$ 16.63
New Jersey	1.00%	15.70%	\$ 16.64
New York	1.00%	17.97%	\$ 14.45
North Carolina	1.40%	14.41%	\$ 9.39
Pennsylvania	0.86%	8.97%	\$ 8.12
Rhode Island	0.36%	21.62%	\$ 18.76
South Carolina	1.39%	27.11%	\$ 13.95
Vermont	0.92%	10.09%	\$ 21.55
Virginia	0.84%	14.79%	\$ 19.84
<b>I-95 Corridor</b>	<b>0.86%</b>	<b>12.79%</b>	<b>\$ 11.88</b>
<b>National</b>	<b>0.82%</b>	<b>11.04%</b>	<b>\$ 12.89</b>

### **Specific Administrative Requirements Which Will Generate Cost Drivers**

The administrative requirements which have been identified in this analysis include but are not limited to the procedures required for these functions, which have been grouped for the purpose of making cost estimates:

- Enrolling user participants

- Accumulating mileages and charges due, by state and by agency
- Calculating and billing the fees to users (with consideration that there may be multiple methods of billing) and utilizing credit and debit card-based payment procedures
- Maintaining user interface and communication; and auditing, security, and enforcement to assure collection of fees from users and to assure the equitable distribution of the fees among agencies
- Calculating and reconciling state and agency mileages
- Distributing revenues among the states and other agencies.

### **Common Drivers of Cost Across All Administrative Requirements–**

There are common drivers of cost which will impact on the administrative costs associated with every one of the administrative requirements. These include

- (1) numbers of vehicles or user accounts;
- (2) vehicle miles of travel;
- (3) numbers of participating agencies; and
- (4) required level of detail in terms of time of day, facility, or geography.

For the first two of these, the cost drivers are relatively proportional to the numbers, although costs will almost certainly decline on a per unit basis for numbers of users as well as for the numbers of agencies involved. For the last factor, the level of geographic or time-of-day or facility specificity is anticipated to drive costs to much higher levels for the more complex VMT charging systems rather than the simpler VMT charging systems.

The NCHRP 19-08 task reports document that toll systems and cordon pricing systems (which are oriented to specific facilities and times) have much higher administrative costs than the costs estimated in that project for VMT systems, which are in turn higher than the costs estimated by NCHRP 19-08 for motor fuel tax systems.

In estimating costs, primary reliance was put on the bids from the Netherlands, with secondary reliance placed on our own analysis of the ways in which a transition to VMT based charges would potentially impact on administrative costs. Information on costs from other planning studies such as for Puget Sound were also reviewed, but not utilized. The Puget sound and other cost estimates are similar or higher than the costs estimated by using the Netherlands bids and our own estimates.

**Drivers of Cost in Relation to Each Specific Administrative Requirement** - Each of the specific requirements was presented in detail in the task one memorandum of this project and is discussed below with a description of the nature and scope of the requirement and, where possible, how the drivers of the costs of administration might differ among the three major technology approaches.

## Enrolling User Participants

Cost drivers for enrollment include but are not limited to

- (1) numbers of accounts;
- (2) whether state registration files are used as the basis for enrollments or not;
- (3) methods and procedures for enrollment such as Internet, mail, trip to DMV office, etc;
- (4) turnover rate of vehicle ownership changes.

**Numbers of accounts** - For each account, there will be additional costs over and above current registration costs, primarily for these specific reasons:

- (1) valid information will be required with regard to the mileage reading of each vehicle, to be used as the basis for billing of future VMT-based charges;
- (2) reregistration will have to be more prompt; although registration fees may be valid for one or two years, vmt charges need to be collected immediately from a new vehicle owner, and should not be collected from the previous owner of the vehicle; and
- (3) more effort will need to be expended by a particular state or by two states to cooperate when a vehicle registration changes hands, due to the need for more rapid accumulation of mileages from the new vehicle owners.

All of the implementation options – simple, moderate, and complex – will require some additional administrative costs for enrolling user participants over and above the current enrollment costs for registrations. Even in the simplest system involving VMT charge collection based on estimated fuel consumption, the user's ID and mileage information must be known in order to establish accounts and later to maintain payment records.

**Whether state registration files are used as the basis for enrollments or not** - It is already noted that basing enrollments on the current files for state vehicle registrations is the only straightforward method of enrolling all of the users that must be enrolled. AAMVA has noted that there are currently vehicles being operated that are unregistered, that have lapsed registrations or that use bogus license plates. States have an interest in collecting vmt based charges which vary among vehicle types, including at least the consideration of vehicle weights and axles and perhaps variations based on other characteristics.

A significant cost driver will be whether registration files are used or a duplicative effort is undertaken for enrollments. The costs and efforts needed for setting up a separate entity to enroll and bill customers should not be minimized. Enrolling and the associated billing of users is itself a significant cost driver, and the additional costs for enrollment and maintenance of a separate database could be substantial.

States could use the DMV process as the mandatory enrollment mechanism and for billing. This does not imply that the functions need to be accomplished by the DMV itself. The functions could be performed by another state agency or contracted out, as long as full cooperation is maintained on registration and VMT files. DMVs maintain a name and address of every registered vehicle (mandatory enrollment) for every state. While the addresses may not be up to date, they should be able to bill the customers and if not paid, then the vehicles would not be allowed to be registered or reregistered. While this is significant work for DMVs (or cooperating agencies or contractors) and they would need additional authority provided to it by the states, it seems to be a cheaper option than duplicative efforts would entail.

While DMVs (due to the need to coordinate with state registration files) may now be the best-positioned of the current entities for managing a VMT-based charge, they acknowledge that they are not now capable of this function and that they lack the capacity to execute a VMT-based system without very substantial external (private or quasi-private) assistance and/or without very substantial additional resources (such as personnel and new information systems) to build the needed capacity to administer vmt-based fees. If other agencies besides DMVs have responsibility for VMT-based charges, those other entities should coordinate the administration of VMT charges with vehicle registration functions in order to avoid duplicative efforts and costs.

**Methods and procedures for enrollment such as Internet, mail, trip to DMV office, etc.** - Another cost driver will be the methods for enrollment and the number of alternative methods. States are moving more and more to registration renewals on the Internet to save time and money and to reduce the need for users to travel to motor vehicle offices.

**Vehicle ownership changes** - Vehicle ownership changes will pose major challenges for VMT administration and will be a very significant cost driver. It is important to recognize that vehicle ownership changes frequently. An administrative mechanism will need to be included as part of enrollment that allows for a very timely “de-registration” of the vehicle, an “in-sale” phase (with dealers) and an immediate “re-registration” transaction that confirms the vehicle’s new ownership and establishes an account.

Since immediate, electronic registration is not available in all states or for all transactions, administrative approaches will need to be designed to accommodate vehicles having temporary registrations (a period of time which is usually from 30 to 90 days until the permanent registration is accomplished by a DMV). VMT processes will likely require nearly instantaneous transaction capabilities for these accounts, whereas speed is less necessary with regard to registration fees.

**Federal enrollment issues** - The federal government would experience major additional costs in enrolling users for VMT-based charges since it has no vehicle registration files (or experience with toll accounts). Since the federal government has no current specific relationship with owners of automobiles and other light duty vehicles, it would either have to rely on state efforts or will need to duplicate the state efforts. Obviously, the cheaper option will be to have one system for all VMT based charges.

**Proposed methods and sources:** The major cost driver will be whether or not this is based on state vehicle registration files. User enrollment will have some additional costs over and above current registration enrollments due to two factors: (1) more information is required (i.e., vmt); and (2) more frequent and more accurate updating of accounts required, including both prompt information on new registration and deregistration. State registration administrative costs, adjusted appropriately, will be the source data. A judgmental addition (fractional multiplier) should be applied and added to the costs of enrollment for current registration fees (including all vehicles and IRP related costs.)

If a new file is required not from state registration files, the costs of enrollments from the experience of IAG agencies should be utilized as the basis for enrollment costs. The new file will be assumed to cost at least as much as current registration enrollment costs.

The costs of enrollment have been estimated in a preliminary manner based upon judgmental estimates of the additional efforts required to speed up and improve the enrollment and de-enrollment processes now used for motor vehicle registrations. Current costs of motor vehicle registrations per vehicle average about \$12.00 per year in the Coalition states, with variations as shown in table 1. Assuming about a 25 percent to 100 percent increase in costs, due to the requirement that enrollments will have to be more rapid and more accurate, and that de-enrollments will have to receive equal attention, an additional \$3 to \$12 per vehicle per year might be incurred over and above current administrative costs for registration fees. The comparable estimates by the Dutch vendors are on the high end of this range. If a duplicative system rather than a complementary system is used, additional costs will be \$15 per vehicle to \$24 per vehicle, reflecting that the costs now incurred for the registration function would need to be duplicated.

## Accessing and Accumulating Mileages and Charges by State and Agency

Cost drivers for accessing and accumulating mileages include

- (1) numbers of accounts;
- (2) frequency of updates of mileages for the accounts;
- (3) required level of detail in terms of time of day, facility, or geography;
- (4) mileage data collection procedures and technologies; and
- (5) mileage data transmission procedures and technologies.

Numbers of accounts are discussed under enrollments above. Frequency of updates is discussed under collecting and billing below.

**Required Level of Detail - Geographic, Time of Day, Facility** - A major cost driver will be whether the requirement for estimating mileages and charges is geographically coarse, such as estimating mileages for each state, or geographically very fine, such as estimating specific charges due to the owners of particular roads (e.g. toll facilities) for travel at a particular time. The situation becomes much more complex and data intensive for administration of charges that would be collected by facility and by time of day. Only fine GPS-based information may suffice for assuring the accuracy of usage estimates by facility rather than by broader geographic area. Even finer data is needed if lanes are to be differentiated by a VMT-based system, such as for distinguishing the usage of HOT lanes versus parallel lanes.

**Mileage data collection procedures and technologies, and mileage data transmission procedures and technologies** - Alternative technologies are available, as described in memorandum one, through which mileages and charges can be calculated, but the administration of processing of the information is an important additional function. Accurate mileage information may be needed for each vehicle or at least for each vehicle owner by jurisdiction or by agency. Data collection and assurance of data quality will be cost drivers for administering VMT-based charges. These technologies and their costs are being assessed in other studies and are not the topic of this effort. Both cellular systems and GPS systems can have sufficient communications capacities to upload VMT data frequently. A back office administrative function will monitor and check on all user accounts.

The functions of accessing and accumulating mileages by state are already performed for the owners and operators of heavy vehicles operating in multiple states under the procedures for the International Registration Plan (IRP).

**Federal Issues** - For federal VMT-based fees, only total annual mileage is relevant. A federal VMT-based charge does not require jurisdictional breakouts, unless federal law determines that such information must be compiled.

**Proposed Methods and Sources and Preliminary Estimates:** The preliminary cost estimate is based on use of the Dutch information from vendors as collected by NCHRP 19-08, on a per vehicle account or per mile basis. The per vmt costs of other fees such as tolls and cordon fees could also be considered as a basis, although these costs will be higher.

Based on the three alternative Dutch bids, the range of costs is \$3.73 to \$20.36 per vehicle per year. The fairly wide range is due partly to how costs were allocated by the three vendors. The low ends or the high ends for each function cannot be added up to get total administrative cost ranges, due to the differences in assumptions by the Dutch vendors about where they included specific costs. However, this range is considered to be reasonable for the likely differences between a simple system of constant VMT-based fees per mile and a more complex system which considers time of day and specific facilities, for which much more record keeping will be required than for a simpler system. On a per mile basis, the Dutch estimates range from \$.42 to \$1.87 per 1,000 VMT.

Simplifying the quantity and frequency of the data could reduce the costs for this function. For example, if only the most basic data on accumulated mileage by jurisdiction were to be collected, rather than data on the use of specific facilities at specific times, the lower range of the above costs might be appropriate. However, the basic function still requires full attention to accuracy, particularly with regard to assuring that information is collected on a timely enough basis to allow for transfers of funds among agencies.

### **Billing and Collecting Payments from Users and Utilizing Credit and Debit Card-Based Payment Procedures**

Cost drivers for billing are mostly parallel to those for enrollment, and include but are not limited to

- (1) numbers of accounts;
- (2) whether state registration files are used as the basis for billing or not;
- (3) methods and procedures for billing such as credit card via Internet, mail, trip to DMV office, etc;
- (4) frequency of billing existing accounts and speed of billing new account;
- (5) required level of detail in terms of time of day, facility, or geography;

Numbers of accounts and whether registration files are used is discussed under enrollments and the same considerations apply here.

**Methods and Procedures for Billing** - States are doing more with new and less expensive procedures including credit card payments over the internet, payment via mail with credit card information provided, etc. AAMVA notes the importance of

keeping any process for VMT-based charges electronic for both the DMV and the customer. States are attempting to change delivery channels from face-to-face to electronic (use of the web) for as many transactions as possible and reduce customers' face-to-face contact. They noted that DMVs are even considering remote eye tests. A VMT-based fee system also must recognize the importance of not putting additional burdens (and thereby costs), such as physical vehicle inspections, on DMVs. AAMVA noted that a VMT system requirement would be a "fully electronic and fully automated" system.

Consideration also needs to be given to the fact that about 17 million U.S. households do not have bank accounts and so are basically reliant on cash-based transactions. A yearly or biannual payment of charges in cash at a motor vehicle agency or other agency is most likely now to be the procedure used by cash households to pay their existing registration fees. There is likely to be some overlap between those households that do not own autos and those households that do not have bank accounts.

Toll agencies which rely on "open road tolling" employ vehicle roadside identification sensors. Those who have EZ-Pass accounts have the transactions recorded electronically and their accounts are billed for the passage through the gantry. Those without accounts have their license plates photographed, and then an automated system (with human checking) identifies the license plate and generates a bill which is sent to the user. This mail-based system for collections could also be applied to VMT-based charges as well as tolls. However, this is administratively very cumbersome and very costly, particularly when considering the prevalence of very small payments.

**Frequency of Billing and Collecting** -Frequency of collection and billing may be the most significant cost driver. If an agency determines that payments will be collected every year or every two years in association with registration or re-registration activities, then the administration of the enrollment and periodic payment functions might be performed in parallel to the administration of registration fees. Because current state motor fuel taxes for light duty vehicles approximate, on average, about \$8 per month, monthly or more frequent collection or reconciliation may not be desired either by the states or by the users.

If the collection of VMT charges only in association with the registration or the re-registration of a vehicle is acceptable, then state collections every one or two years would focus on assessing the vehicle miles of travel of the vehicle being registered or re-registered. Prepayment of the next period's likely VMT charges could be done at the same time as any rebate or additional fee is paid for the most recent period, thus minimizing administrative costs. Refreshing balances in a credit account is the standard practice with E-ZPass. Remittance schedules for registration are staggered so that most of the work evens out over months of the year and similar staggering of remittance schedules should be done for VMT-based charges.

**Required level of detail in terms of time-of-day, facility, etc.** - More complex fee structures such as those that might be implemented for proposed congestion pricing approaches or for purposes of controlling greenhouse gas emissions would possibly involve substantially higher charge levels than are collected today, and thus a single payment for a full year's time could involve very substantial sums. However, more frequent payments will entail more challenging and costly administrative efforts and more time by users to make payments.

**Federal Issues** - Current Federal motor fuel taxes on light duty vehicles are of a comparable average magnitude to state fuel taxes of around \$100 per vehicle per year. Since the federal government has no current relationship with the owners of light duty vehicles, it would either have to rely on state efforts or duplicate state efforts. More frequent than annual billings for the federal government would seem to be unreasonable.

**Proposed Methods and Sources and Preliminary Estimates:** The preliminary cost estimate is based on use of the Dutch information from vendors as collected by NCHRP 19-08, on a per vehicle account or per mile basis. The frequency of billing would also be a parameter needed to adjust costs. E-ZPass and IAG related costs for billing could also be assembled from agencies or vendors as a basis for these costs. However, those cost estimates will be quite high on a per vehicle or per mile basis, since the level of usage varies so substantially for these systems, with occasional users driving up the costs substantially in relation to revenues from those users. The preliminary estimate per vehicle per year based on the three Dutch bids ranges from \$5.89 to \$27.24.

These figures also vary based upon how the three vendors allocated their costs. The fairly wide range is due partly to how costs were allocated by the three vendors. The low ends or the high ends for each function cannot be added up to get total administrative cost ranges, due to the differences in assumptions by the Dutch vendors about where they included specific costs. More frequent billing will be associated with the higher end of the range. If the billing is largely automated, as anticipated by the vendors making bids in the Netherlands, there may be little opportunity to reduce costs by reducing the frequency of billing.

We could also base the cost estimate on whatever cost information could be gathered from interviews with private vendor interviews in the U.S. who are similar to the Dutch vendors, although it is not at all certain that they have made comparable estimates or that they would have any incentive to share such information, given that they may be involved in future competitive bids.

## **Maintaining User Interface and Communication; and Enforcement, Auditing, and Security to Assure Collection of Charges from Users and to Assure the Equitable Distribution of the Revenues Among Agencies**

User interface and communications cost drivers include (1) level of customer communications with regard to the administration of accounts; and (2) for the more complex charging structures such as congestion pricing, information to the user on the charges.

**Level of customer communications** - User interface and communications are needed to resolve all changes in status of enrollments and to resolve collections and enforcement issues. Toll agencies have broad experience with the costs of user interface and communications. The individual toll agencies cooperating on E-ZPass specify their own back office user interface and communication procedures and the performance standards for their back office procedures. Agencies make their own arrangements (in house or contracted out) for their back office customer service centers, which are responsible for tag distribution, answering queries, administering the accounts of the users, and conducting violation enforcement.

**Information to the user on charges for complex systems** - There needs to be consideration, in the more complex scenarios, of the communication of charges to users. If charges vary by route, by time of day, by level of congestion, etc, then consideration should be given to creating tools that allow a user to determine reasonably the expected cost of their trip. The more complex the set-up, the more information will be required. This also gets in to how frequently to bill the user. The less frequently a user is billed, the less likely they are to change their behavior based on the cost of the trip(s). More frequent feedback - maybe even built into the more advanced technology - should consider providing this feedback in real time to the user.

Enforcement and Auditing cost drivers will include (1) monitoring of the functioning of all user equipment associated with VMT charges; (2) monitoring of accounts payment status, and actions to assure payment; and (3) auditing of accounts

**Monitoring of the functioning of all user equipment associated with VMT charges** - A component to monitor whether the in-vehicle systems are functional while the vehicle is in use will be required. This might be done through a satellite or cellular communications system that can check on a vehicle's status in real time. Administrative procedures will be necessary for enforcing the collection of charges that are due on vehicles with non-functioning systems.

**Monitoring of payments status** - How frequently and what actions are taken with regard to lax payments will be a large cost driver. User appeals and grievances with billing will need to be addressed and will require considerable back office

administrative support in order to resolve such issues fairly and quickly. The experiences with the procedures currently in place under IRP and under E-ZPass may offer some guidance on the implications for the administrative efforts and costs of appeals and grievance resolutions for multi-state vmt-based fees.

In terms of enforcement, toll agencies employing electronic toll collection have been facing the challenge of toll violators for years. With the move toward more open-road tolling configurations, the challenge of toll violations has been compounded with inadvertent toll violators adding to the problem of those deliberately attempting to evade the toll. Toll operators have used an array of increasingly sophisticated violations enforcement systems (VES) to protect revenue streams with digital imaging and automated license plate recognition (ALPR) technologies to accurately capture license plate images in order to identify vehicle owners without transponders.

**Auditing of accounts** -Auditing will be another important function to assure that reporting and payment of VMT-based charges are legitimate. A primary concern among the states will be whether other states are sufficiently competent in auditing and enforcement so that users do not have a lax base state. The IRP has record keeping requirements to enable audits rather than a regular reporting requirement. For light vehicle owners, such records are not currently kept, and automated procedures are considered to be the only option for record keeping that would not add an unreasonable burden which would not be acceptable to the general public.

Violations processing in electronic tolling represents a sizeable administrative cost at the back office, and often other related costs for collection agencies and legal services firms to pursue egregious toll violators. The sophistication of the new VES technologies have spurred many toll operators to begin to consider cashless toll operations, by which travelers are encouraged to have a toll tag, such as E-ZPass, but those drivers without a tag have a bill sent to the vehicle owner. Both the traditional VES applications and newer cashless tolling operations depend upon firm relationships with numerous motor vehicle agencies to ensure a trusted method to identify vehicle owners. New concepts of operations for many new cashless toll operations are increasingly dependent on a supportive state legislative foundation to ensure adequate penalties for non-payment of a post-paid video toll transaction. For these systems to work well on many toll facilities within the Coalition region, multi-state agreements for violation collections and penalties are fundamental. This will certainly be an area in which enforcement and collections VMT-based fees can be considered collaboratively with toll authority needs that are being established.

**Proposed Methods and Sources and Preliminary Estimates:** The preliminary estimate is based on use of the Dutch information from vendors as collected by NCHRP 19-08, on a per vehicle or per mile basis, using the estimate of per mile for enforcement costs; this

should be compared with estimates of enforcement costs which will be compiled by NCHRP 19-08 and IRP for all of the other types of fees. A preliminary estimate on a per vehicle per year basis from the Dutch vendors is \$1.46 to \$9.51 per vehicle per year. The fairly wide range is due partly to how costs were allocated by the three vendors. The low ends or the high ends for each function cannot be added up to get total administrative cost ranges, due to the differences in assumptions by the Dutch vendors about where they included specific costs.

The Netherlands bids may be low for U.S. agencies, which tend to place a very high premium on customer responsiveness. Many toll agencies and DMVs want to assure that inquiries and requests are handled expeditiously and with courtesy.

### **Calculating and Reconciling State and Agency Mileages and Calculating the Revenues Due to Each Agency**

Cost drivers will include (1) numbers of accounts; (2) numbers of agencies; (3) geographic, time-of-day, facility, and agency detail of charges due; and (4) frequency of calculations. Numbers of accounts and numbers of agencies and frequency of calculations are straightforward parameters which multiply some of the unit cost factors, whereas geographic and agency detail is a highly complicating cost driver.

**Geographic, time-of-day, facility, and agency detail of charges due** - For the more complex fee structures under which payments would be due for travel by specific facility, either the drivers or the automated systems might be expected to substantiate travel on specific facilities or even on specific lanes. This level of complexity requires additional burdens for both the agency and the users of the system under the more complex charging arrangements.

**Federal Issues** - For federal VMT-based fees, only total annual mileage is relevant, unless the federal government determines through statute that it wishes to have such information, perhaps in order to participate in pricing travel based on time of day and facility.

**Proposed Methods and Sources and Preliminary Estimate:** The estimate could be based on use of the cost experience of IRP. It is not certain that if IRP handled this function there would be any added costs.

### **Distributing Titling Data and Revenues Among the States and Other Agencies**

Cost drivers for distributing titling data and revenues will be (1) ability to build upon existing systems.

**Building Upon Existing Systems for Titling** - Titling data needs to be transferred among states. The National Motor Vehicle Title and Information System (NMVTIS) is a potential base infrastructure model to build upon for use as a platform for a multi-state VMT-based fee system. NMVTIS was designed and built to allow states to exchange title data as vehicles transverse across state lines and to prevent fraud, especially title washing.

No personal data or information is included in the NMVTIS data elements (the system only includes VIN information) but the interoperability among most states currently exists. The lack of full state participation is currently an inhibitor as is the infrequency of information updates from some states. AAMVA points out that with all but five states currently participating in NMVTIS, about 75 percent of all registered vehicles in the US are included in the system and that the system will include 100 percent of the states and vehicles in the next two to three years. It is important to recognize that the NMVTIS is not a national database and that even without personal information included (as part of the current data elements), states remain very concerned with the use of the data. In order for the NMVTIS to serve as a base for any VMT-based fee program, personal data regarding vehicle ownership and ownership transfers would need to be added. This addition of owner specific data, and the sharing of that data with other states or private entities, would be a concern for states.

AAMVA notes that states currently work together on the driver side of the business through reciprocity compacts such as the Driver License Compact and the Non-Resident Violators Compact. They noted that these arrangements work well. They also noted that states work well together through the Commercial Driver License System (CDLIS - a federal mandate governing commercial driver licensing) and the National Motor Vehicle Title and Information System (NMVTIS), as well as IRP. They note that states are accustomed to sharing data through CDLIS and NMVTIS. AAMVA is the current operator of CDLIS and NMVTIS. Their current network, AAMVA-net, provides the link for the exchange of information among states. They noted that there might be a role for them regarding VMT-based programs if their members and board considered and agreed after a comprehensive review.

**Building Upon Existing Systems for a Revenue Clearinghouse** - An administrative mechanism will need to be established for the clearinghouse function of redistributing revenues among agencies so that each agency receives the net revenues that are due. If accurate mileage accounts are kept, reconciliation and transfers are not difficult. The existing IRP Clearinghouse acts as a "netting" system for all states (except 1) and the Canadian provinces for IRP fees. It was developed to reduce paperwork for the jurisdictions and to facilitate information exchange and payments. Payments are "netted" the 15<sup>th</sup> of every month. The entire Clearinghouse is "wrapped" in a procedures manual and processes. The Clearinghouse does not determine fees, states

do. IRP noted that the Clearinghouse saves the states money by providing a template for administration and easing processing time and effort.

**Federal issues** - For federal VMT-based charges, only total annual mileage is relevant and common federal revenues would be collected independent of where travel occurred.

**Proposed Methods and Sources and Preliminary Estimate:** The preliminary estimate is included in the preliminary estimate for the costs of enrollment. Based on experience from IRP, the assumption was made that enrollment procedures are vastly augmented and highly coordinated between the states, accounting for the increased estimates made for the enrollment costs (above).

**Total Preliminary Estimates of Administrative Costs:** Because each of the three Dutch vendors allocated their bid costs differently, the total yearly costs of operating or administering their systems provide the best indicator of what the vendors expected with regard to costs. The total yearly costs for each vendor ranged from \$51 per vehicle to \$115 per vehicle. Because our assumptions about the range of enrollment costs is from \$3 to \$15 per vehicle, and the lowest total Dutch bid included about \$14 per vehicle, the range of preliminary estimates of all administrative costs for our purposes is from \$40 per vehicle per year upwards, for systems assumed to have the full functionality specified in the Dutch bid process.

For VMT-based fee systems with less functionality, such as systems which track only total yearly VMT for each vehicle, the range could start at lower levels. However, even choosing (inappropriately) from the lowest level of each of the three Dutch bids for each of the cost elements which they based their bids upon, the yearly costs per vehicle could not go below \$14 per vehicle. This level of cost is not likely to be achievable.

**Missing Costs:** The NCHRP 19-08 report also included the Dutch vendors estimates of start-up costs including equipment costs, and miscellaneous costs. Chief among these was a one-time cost for the new technology on the vehicle, and the start-up costs for the three vendors ranged from \$222 to \$283 per vehicle. Even if amortized over an expected 15 years of service for a vehicle, this would add substantially to annual costs. In addition, the issue of who pays arises for this initial equipment.

**Reduced Administrative Cost Estimates Compared to the Netherlands Estimates:** Our analysis indicates that the costs of enrolling might be lower by \$10 or \$11 than the lowest Netherlands estimates (\$51 per vehicle) by building on registration procedures and files and that billing and collecting might be lowered by another \$10 for simple systems collecting only straightforward VMT charges per mile very infrequently. Our lowest administrative cost estimate is thus \$30 to \$40 per vehicle.

## VMT Administrative Costs in Context

In the Netherlands, the VMT based fee is suggested to replace a very wide variety of existing fees. Europeans collect much more total money from highway usage than is collected in the United States, applying a wide range of fees. On average, the European Countries collect about \$1,400 per person per year in highway fees, much of which is used for other non-highway purposes. The Netherlands expected to spend only six percent of their expected VMT fee revenues on VMT fee collection. This is a higher percentage on collection than for motor fuel taxes, but a much lower percentage than for toll collections.

The European fees of \$1,400 per person per year is in comparison to U.S. expenditures of only \$120 billion per year on highways, which is about \$400 per person per year spent on highways, or about \$500 per year per registered vehicle in the U.S. In the U.S., we collect about 40 cents in combined state and federal fees per gallon of motor fuel. Motor fuel taxes in the U.S. equate to approximately half of all expenditures on highways and local roads. Much of the remainder is made up of local general purpose fees. Combined motor fuel fees at the state and federal levels equate to about \$250 per year for all vehicles combined, including heavy long distance trucks, and about \$200 per year for light duty vehicles (which average 20 miles per gallon).

If VMT fees replaced all existing fees used for highways (about \$500 per vehicle per year), then the lowest estimate of administrative costs for VMT fees per vehicle (with a current estimate of \$30 per year) equates to about six percent, about the same as the Netherlands estimate for collection costs in relation to revenues.

If the VMT fees replace only fuel taxes or some other portion of overall highway expenditures, then the percentage for collection is greater. For a light duty vehicle with only \$200 per year of motor fuel taxes, a VMT fee which cost \$30 per year in administrative costs would represent a higher percentage. Collection costs for most state motor fuel taxes are less than one percent of revenues.

Highly respected studies by U.S. DOT (The 2008 Conditions and Performance Report) and by AASHTO (the 2008 Bottom Line Report) indicate that economically justified U.S. highway capital needs are at least twice as great (\$132 billion to \$160 billion plus per year) as are existing highway capital investments (about \$68 billion per year). Capital investments represent about half of highway expenditures. If adequate revenues were collected for economically beneficial highway investment in the United States, and if VMT fees were used to fund all investments, then the percentage of annual collection costs (using the lowest estimate of \$30 per vehicle) would represent even less than the six percent of costs compared to revenues which was estimated for the Netherlands.