COLLECTION AND ADMINISTRATION COSTS

Distance-based feeds (DBFs) are expected to be a more reliable and consistent funding source for the roadway system in the future (Coyle, Robinson, Zhao, Munnich, & Lari, 2011; Weatherford, 2011; Zhao, Guo, Coyle, Robinson, & Munnich, 2015). Given the low administrative cost of the motor fuel tax in the state (about 0.25 percent of the total revenue collected[1]), designing an administratively efficient DBF system is crucial for the state of Minnesota.

A key concern regarding the implementation of a DBF system is its administrative cost. Currently, Oregon was the first state in the U.S. with an operating DBF system that collects revenues from users and the administrative costs are estimated to be around 40 percent of the revenue collected (CalSTA, 2017). And while collection costs are certain to decline with economies of scale as more drivers subscribe, it is not clear how much of that overhead can be reduced. In this section, we discuss the costs of administering a DBF and compare them to the motor fuel tax system, other taxes, and utility systems. In addition, as Shared Mobility (SM) providers are partners on MnDOT's current DBF demonstration, we discuss how this partnership simplifies the collection of a DBF system and review other fees and regulations that apply to these providers.

Administration of a DBF System

The administrative costs of a Distance-Based Fee system are higher than those of the motor fuel tax system. In terms of the total revenue collected, a state-level DBF system is estimated to cost between 5 and 13 percent of total generated revenue, while the motor fuel tax costs less than 1 percent (Sorensen, Ecola, & Wachs, 2012; Kirk & Levinson, 2016). In terms of vehicle miles traveled, a DBF system is estimated to cost between $1.79 and $65 per 1,000 vehicle miles traveled (VMT) depending on the features of implementation,[2] while the cost of motor fuel tax is $0.10 per 1,000 VMT (Rufolo, 2011).

Administering the motor fuel tax is very efficient and low cost compared to administering other taxes and fees. Table 1 shows the administrative costs of several transportation-related taxes and fees collected by Minnesota state agencies and local agencies. The purpose of the taxes and fees presented

[1] Amount based on administrative expenses of $2.194 million and revenue collection of $878.2 million for FY2020 (MMB, 2021).
[2] The upper bound of the estimates corresponds to the German system, which is only used for heavy vehicles on specific roads.

in the table is to generate revenue except for the MnPASS fee that was designed to manage traffic demand and congestion.[3]

Table 1: Administrative Costs of Taxes and Fees at the State and County Level

Collection Level	Tax/Fee	Admin Costs (as percentage of revenue collected)	Notes
State (1)	Motor Fuel Tax	~0.25% for FY2020	Collected by Department of Revenue
	Registration Tax (2)	~1.14% for FY2020	Collected by Department of Public Safety
	Wheelage Tax	Between 0.5% and 0.7% of total revenue or 5-7 cents for every $10	Information based on 5 counties and a $5 wheelage tax. New information to be updated by AMC. Tax added to vehicle registration (Minn. Stat. 163.051), collected by DVS.
	Managed Lanes (MnPASS)	Information for FY2017: I-394 - ~61% (13 years of operation) I-35W - ~58% (8 years of operation) I-35E - ~63% (2 years of operation)	Revenue is used for capital costs and operations and maintenance expenses. Remaining revenue is split equally between MnDOT and the Met Council for highway and transit improvements in that corridor.
Local	Gravel Tax (Aggregate Tax)	County auditor may retain an annual administrative fee of up to 5% of revenue collected	Counties administer and collect the tax (Minnesota Statute 298.75)

Notes: *(1) DOR collects taxes such as the sales tax and local option sales tax among other taxes, but individual costs of collection are not available. (2) Costs include other costs related to registration taxes such as issuing license plates.* ***Sources:*** *MnDOT* (2018)*, Kleman* (2018)*, MMB* (2021).

Administrative costs for the MnPASS Express lanes included in Table 1 were between 58 and 63 percent in 2017 depending on the corridor. The costs included as administrative costs are operation contracts, enforcement, staff from the Minnesota Department of Transportation -MnDOT and IT services -MNIT,

[3] The MnPASS fee is automatically set to a level that maximizes lane use while keeping the lane flowing at 50-55mph. MnPASS is a traffic management tool designed to increase person throughput, improve travel time reliability, and increase transit ridership and carpooling.

utilities, and miscellaneous equipment and supplies.[4] The administrative costs for the various MnPASS corridors vary widely throughout their lifetimes, but generally decrease rapidly during the first several years of operation. For instance, the I-394 administrative costs have been as low as 29 percent of total revenue in 2009 and as high as 100 percent and 96 percent in 2005 and 2016, respectively. The variation in the administrative to total revenues ratio can be attributed to changes in total revenue due to lane usage as a result of weather and construction events, as well to changes in administrative costs due to increases in operating contracts as a result of system changes (MnDOT, 2018).[5]

Several DBF pilot projects indicate that DBF administrative costs vary widely between 2 and 40 percent of total revenue collected (see Table 2). Most of the costs are estimates except for the OReGO program which was launched in 2015 in Oregon and is currently one of the operating DBF systems in the U.S. The state of Utah also has an operating Road Usage Charge program since 2018.

The administrative costs of OReGO are 40 percent of total revenue collected, but are expected to decline to less than 10 percent as the number of users participating in the system increases to hundreds of thousands (CalSTA, 2017). Participation in the program is currently voluntary and administrative costs would need to be reduced before making the program mandatory. This could be achieved by offering users the option of a flat annual road usage charge, creating effective compliance mechanisms, and partnering with other states to realize economies of scale. According to OreGO's 2017 report, the program cost $2.3 million to operate between July 2015 and December 2016, and is expected to generate $340 million in revenue between 2015 and 2025. Assuming annual costs of $4.6 million and annual revenues of $34 million, the yearly administrative cost of the program is roughly 13.5 percent of generated revenue (ODOT, 2017).

Similarly, Utah's Road Usage Charge program costs are expected to decrease. Currently, some alternative fuel vehicles are eligible to participate in the program including full EVs and hybrids (plug-in hybrid and gasoline hybrid vehicles). In the first year of the program, the state DOT spent $1,040,000. This cost included start-up efforts such as a communication campaign and development of the commercial account manager. The program collected approximately $42,000 in its first year (Braceras, 2021).

[4] Other costs such as the costs dedicated to planning future MnPASS corridors as well as capital costs such as equipment installation, lane engineering and construction, and communications about the new lanes are not included in these calculations.

[5] Administrative costs for I-394 and I-35W spiked in 2016 due to an operating system upgrade and "additional up-front expenses under the new enforcement contract (e.g., state trooper academy training costs, vehicle and equipment purchases)."

Table 2: Administrative Costs by Project Implemented

Program	Features of Implementation	Administrative costs (as % of revenue collected) (1)	Number of Users
Wyoming (2021)	(pilot) Unknown	**9.4% (est)**	Not Available
Washington (2020)	(pilot) Participants chose between five collection methods and two account managers. No-tech to high-tech collection options. Volunteer basis.	**7 - 13% (est)** 7-8% - Manual 12-13% - Technology based 10% - combination	>2,000
I-95 Corridor Study (2019)	(study) Commercial and State account managers. Assumed that most collection will be through electronic methods.	**8% (est)**	Not Available
Utah Road Usage Charge (2018)	(fully implemented) Account managers. OBD mileage reporting device. Voluntary for electric and hybrid vehicle owners.	TBD	3,500
OReGO (2017)	(fully implemented) Three account managers, including the state. GPS and non-GPS options. Value-added services available. Volunteer basis.	**40%**	>5,000
California Road Charge Pilot Program (2017)	(pilot) Demonstrated six reporting and recording methods through four account managers. Collection methods ranged from no-tech to high-tech. Heavy vehicles were included. Volunteer basis.	**2.5 - 15% (est)** ~2.5% - heavy vehicles ~5% - high tech ~7% - low tech ~15% - state operated	>5,000

Notes: *(1) Reflects costs to the government as opposed to costs incurred by third-party account managers. In some cases, these reflect costs the government pays to third-party account managers for the operation of the DBF system.*

The administrative costs vary widely among pilot projects due to several factors such as the costs included as administrative costs, the technology used, the number of users included in the program, and the agency collecting the charge. First, pilot projects include different costs under what they report as administrative costs. In the I-95 corridor study, for instance, administrative costs consider *"education and outreach, certification and ongoing monitoring of account managers, changes to DMV operations and software to support system enrollment and compliance efforts, payment enforcement and collection activities, and the need for the state to accommodate cash payments"* (I-95 Corridor Coalition, 2019). On the other hand, a pilot conducted in Oregon in 2006 included "*auditing, enforcement and*

administration, communication lines" while the 2012-2013 study included "*device communications, data analytics, mapping, data hosting, and account management and billing*" (ODOT, 2013; ODOT, 2007).

Second, administrative costs also vary with the technology used. In the Washington pilot project, the estimated costs of administering a DBF system using a time permit and odometer charge were approximately 7–8 percent of revenue collected. These costs increased to 12–13 percent when using a plug-in mileage metering device. If a combination of both is used, costs would be just under 10 percent of revenue collected. The California pilot project found that manual collection of mileage information could be the most expensive to administer. Currently, California is exploring a pay-at-the-pump collection method in order to replicate current user experience with the fuel tax and to potentially reduce collection costs. Lastly, the I-95 corridor study suggests technology-based collection methods will result in lower administrative costs than manual collection methods (WSTC, 2020; CalSTA, 2017; I-95 Corridor Coalition, 2019).

Third, the number of users or vehicles included in the program affects administrative costs. DBF pilot projects provide evidence that DBF administrative costs decrease as the number of vehicles involved in the collection system increases due to economies of scale (WSTC, 2016; ODOT, 2017).

Fourth, administrative costs also depend on the agency in charge of its collection. The pilots in Oregon, California, and Washington estimated a decrease in DBF administrative costs with a commercial partner that centralizes its collection. The commercial partners, for instance, can provide value-added services[6] that offset the costs associated with DBF collection, quickly adapt to evolving technologies, and operate in several jurisdictions (WSTC, 2016; ODOT, 2017; CalSTA, 2017).

Lastly, other research suggests that substantial cost savings could be realized if some administrative costs associated with vehicle registrations and toll collections were integrated into DBF systems. According to the I-95 Corridor Coalition (2012), such integration can reduce the annual administrative cost of a DBF system in the U.S. from $51 to about $40 per vehicle.

Figure 1 presents the administrative costs of a DBF system in the Washington Pilot. The costs of a DBF system are estimated for two scenarios, one in which the state collects the fee and the other in which a commercial partner collects it, and compares them to the current motor fuel tax (WSTC, 2020). As mentioned earlier, administrative costs are expected to decrease as the number of vehicles involved in the collection system increases as well as when commercial partners are involved.

[6] Commercial account managers in Oregon, for instance, allowed volunteers to check their mileage and other driving statistics, and their badges (awarded for certain driving behaviors). They also allowed the driver to set a geographical boundary and receive information when the vehicle leaves it (helpful for drivers with a younger dependent).

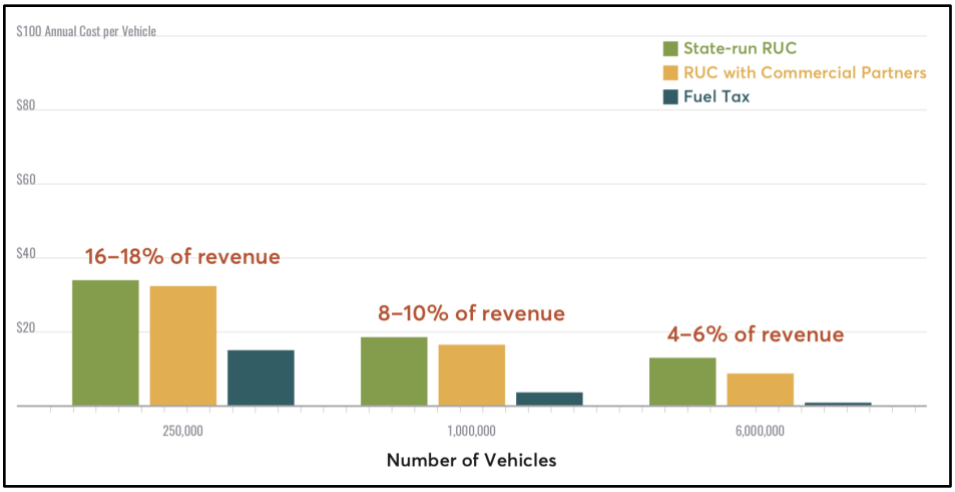

Figure 1: Costs of DBF compared to Fuel Tax, at various vehicle volumes (Washington RUC)
Source: *WSTC* (2020, p. 23).

Figure 2 presents the costs of collection of a DBF under several scenarios in California pilot (CalSTA, 2017). The stabilization of the costs over time assumes that technology and service companies make breakthroughs that increase consumer adoption of in-vehicle services that serve as a platform for the DBF system. Several scenarios developed in the pilot estimated collection costs below 10 percent of total revenue in the long term.

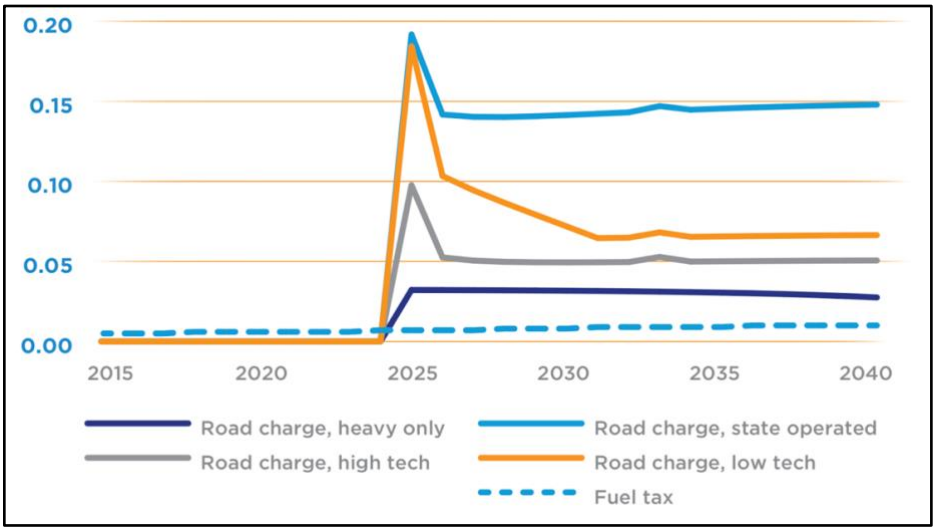

Figure 2: Costs of DBF under different scenarios over time (California RUC)
Source*: CalSTA* (2017, p. 71).

The costs of collecting a DBF system could also be compared with the costs of collecting utility fees as both are user fees. Overall, the research in this area is limited, but the costs of collecting a road usage charge are estimated to be more costly compared to utilities such as gas, water, electricity, and telecommunications which have collection costs of 5-10 percent (CalSTA, 2017).

As of 2020, the Minnesota Department of Transportation is running a DBF demonstration in collaboration with Shared Mobility providers. The collaboration with SM providers aims to improve the administrative and political feasibility of a DBF system. There is potential for higher administrative feasibility with the demonstration as it reduces collection points and uses existing in-vehicle technologies. Similarly, there is potential for higher political feasibility since partnering with SM providers could address privacy and data protection concerns (see privacy memo for further information).

Reducing Collection Points

State and federal motor fuel taxes are relatively cheap to administer due to the small number of wholesalers that are billed (DeGood & Madowitz, 2014). DBF costs, in contrast, are higher due to the costly infrastructure to read, store, process, and bill a large number of individual drivers (Duncan & Graham, 2013). By partnering with SM providers, the number of entities that are billed is still larger than collecting the motor fuel tax at the wholesale level, but is much lower than administering a DBF at the individual driver level.

Minnesota's DBF demonstration reduces collection costs by billing SM providers instead of billing drivers individually. SM providers will process the mileage data of all vehicles in their fleet and report it to the state.

Using existing technologies

A Distance-Based Fee system in partnership with SM providers has the potential to reduce or eliminate program start-up costs. Start-up capital costs for a DBF system are the costs related to the technology required to track and transfer VMT data, including the development, purchase, and installation of third-party GPS devices and transponders in vehicles.

Minnesota's DBF demonstration eliminates start-up capital costs by leveraging existing resources. SM providers already have a fleet of vehicles equipped with GPS-enabled tracking and anti-theft technology in order to provide transportation services to their customers. With this existing technology SM providers can determine the location of the vehicle during a reservation, monitor the state of the vehicle, and bill customers for time and mileage use of the vehicle. It is assumed that SM providers have better, cheaper access to technology and data than the state for mileage reporting (WSTC, 2016). In addition, SM providers are in a better position to keep pace with evolving technology (vehicle electrification and automation) as these technologies become necessary to compete in the Shared Mobility market.

Leveraging existing relationships with customers

The nature of shared-mobility services involves sharing information. SM providers offer vehicles with embedded technology to their customers and customers agree to share trip information to be billed for the usage of the vehicle. SM providers have established contracts and privacy policies that help prevent the dissemination or transmission of personal information and its inappropriate use.

Minnesota's DBF demonstration leverages this relationship to address privacy and data protection concerns. There is no need to have additional privacy policies put in place between drivers and the state than what already exists between SM providers at their customers. When reporting mileage in the demonstration, SM providers will report information aggregated at the vehicle level and, therefore, no personally identifiable information (PII) should be disclosed. In addition, SM providers will not report specific vehicle point locations, but rather aggregated per car mileage for the month.

There is potential for the existing relationships between shared mobility providers and their customers to facilitate customer acceptance of DBFs. The SM customer understands that using a SM service is different than using a personally owned vehicle, and because of this are potentially more accepting of business practices and procedures that the SM might have in place, such as collection of certain taxes or fees. The nature of this relationship between customer and SM provider could lead to more acceptance by SM users due to the customer's understanding of SM business practices.

Fees and Regulations that Apply to Shared Mobility Providers

Shared mobility providers are subject to taxes levied on the services they provide, in addition to regular transportation taxes - such as the motor fuel tax, registration taxes, and motor vehicle sales taxes. While there are no taxes levied on ride-sourcing services in Minnesota,[7] there are taxes levied on car-sharing services. These taxes include the sales taxes, the rental motor vehicle tax, and the motor vehicle rental fee.

Car-sharing companies are subject to pay sales taxes, which include the state general tax, a county sales tax, a city sales tax, and a local option sales tax (see Table 3). The state general tax applies to all transactions within the state, and additional local sales taxes apply depending on the locality where the trip originated. The final tax rate is applied to the total cost of the reservation, including mileage charges and punitive fees.

Table 3: Sales Tax in Minnesota

Tax	Rate
State General Sales Tax	6.875%
County Sales Tax	0.15% (Hennepin)
City Sales Tax	0.50% (Minneapolis, St. Paul) 0.75% (Rochester)
Local Option Sales Tax	0.50% (Hennepin, Ramsey, Olmstead)

[7] For more information on taxes levied on ride-sourcing services across the U.S. see Zhao, Fonseca, & Zeerak (2019).

These companies are also subject to the rental motor vehicle tax of 9.2 percent and the motor vehicle rental fee of 5 percent (Minn. Stat. § 297A.64). The percentages are applied to the sales price. Nonprofit car-sharing operators are exempt from the motor vehicle rental fee.

All these taxes add up to an approximate tax burden of 22 percent for car-sharing operators in the state and become a strong barrier for being competitive in the shared mobility market. This high tax burden, for example, makes it hard for car-sharing services to compete with other SM services such as ride-sourcing services (provided by Transportation Network Companies -TNCs- like Uber and Lyft). These services have been shown to have a negative impact on congestion and greenhouse gas emissions in many cities, while car-sharing services have shown to provide societal benefits of reduced personal car ownership, increased walking and biking without reduced transit use, and reduced parking demand that typical car rental services do not (Schwieterman & Spray, 2016).

Additionally, this high tax burden reduces the supply of transportation services in Minnesota. High taxes are cited as the reason why car-sharing providers have left the Minnesota market. This is important since shared mobility services are critical when other transportation modes cannot meet the needs of a certain trip or certain populations, such as Minnesotans living without personally owned vehicles.

Car-sharing services across the U.S. face tax burdens that are higher than most other segments of the economy (Schwieterman & Spray, 2016). A study considering the 40 largest cities in the country found that eight of these cities levy taxes on car-sharing trips that are 15 percent or higher, with some reaching levels of over 30 percent. Among the 40 cities, Minneapolis was found to have the 10th highest tax rate on one-hour car-sharing reservations and the 2nd highest tax rate on 5-hour reservations (Schwieterman & Spray, 2016).

The rationale for the high tax rates levied on car-sharing services is that these services are the same as traditional car-rental services, which are traditionally subject to high taxes due to their exportability (Schwieterman & Spray, 2016). Car-rental services are typically used by tourists and visitors of a municipality. Therefore, taxes levied on these services are paid by tourists and visitors as opposed to residents (Murray, 2006). This tax exportation makes a tax politically feasible. However, while most traditional car-rental customers are from out of town, most car-sharing customers are local residents and the application of a tax intended to be exportable, like the MVRT, is inappropriate when applied to car-sharing. Car-share providers have testified at the Minnesota state capital for exemption from the 9.2 percent rental vehicle tax, without success (Bakst, 2017). This is in an effort to reduce the tax burden borne by local residents and users of car-sharing services.

Potential Future Benefits of Collaborating with Shared Mobility Providers

Partnering with SM providers offers potential future benefits that can reduce administrative costs. First, shared mobility services are expected to continue growing (Grosse-Ophoff, Hausler, Heineke, & Möller, 2017), which increases the number of vehicles involved in the collection system and, thus, reduces collection costs. Second, the DBF system could be expanded to several SM services, including ride-

sourcing, car sharing services, and bike and scooter sharing, to capture more fleets and a larger number of vehicles. This is important as we look towards a potential future where mobility as a service becomes more common (Goodall, Fishman, Bornstein, & Bonthron, 2017). Third, substantial cost savings could be realized with the integration of DBFs and other charges levied on shared mobility services (as I-95 Corridor Coalition, 2012 found) such as the motor fuel tax, registration fees, sales taxes, tolls, and vehicle rental taxes and fees, among others. SM providers already include a process for sales tax remittance within their internal operations. Integrating a DBF payment into these existing internal operations could ease the collection process and the costs associated with it. Lastly, SM providers can also operate in multiple states allowing for easy interoperability of the DBF system. SM provider operation in other jurisdictions facilitates the charge of out-of-state VMTs (WSTC, 2016).

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