



Switching Gears:

A New Way to Fund Transportation

May 2019



FOREWORD

Founded in 1932 the Citizens Budget Commission (CBC) is a nonprofit, nonpartisan think tank devoted to influencing constructive change in the finances and services of New York State and New York City governments. A major activity of CBC is conducting research on the financial and management practices of the State and the City and their authorities.

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TABLE OF CONTENTS

3	Introduction
4	Overview
5	Program Design Components
7	Additional Implementation Considerations
10	Recommendations for Implementation
12	Conclusion
14	Endnotes

Introduction

By authorizing a new congestion pricing fee New York State's elected officials assumed a place of national leadership in transportation financing. The new approach serves the dual goals of raising revenue and reducing traffic congestion; however, the measure is not a complete solution to the State's need for transportation funding. The new fee and other new revenues will fund a large part of the capital needs for mass transit in New York City, but substantial mass transit and road and bridge capital infrastructure investment shortfalls remain unaddressed across the state. New York's leaders should build on their latest accomplishment by laying the groundwork for a future financing mechanism, the vehicle-miles traveled (VMT) fee—a mileage-based user fee that collects revenue from road users for each mile they travel.

The quality and reliability of New York State's roads and bridges are significant for economic activity, public safety, and residents' connectivity. These roads and bridges are also significant in terms of scale; there are 115,000 miles of roads and more than 17,000 bridges. New York State—through its Department of Transportation (NYSDOT)—is responsible for more than 15,000 miles of roads and nearly 8,000 bridges; other facilities are responsibilities of local jurisdictions or authorities.¹

Significant State investment is required to repair and to preserve its assets. Approximately \$5.7 billion annually is required for the State to achieve a state of good repair on its assets, but 37 percent—\$2.1 billion—of that necessary repair work is deferred.² That underinvestment jeopardizes the condition of New York's facilities and leaves the Empire State well behind the nation. New Yorkers drive on roads in “rough” or “very rough” condition at a rate double that of drivers in the rest of the United States.³ The State also has a greater share of bridges rated structurally deficient than the rest of the nation.⁴

Failure to maintain a state of good repair on the State's roads and bridges is a perennial problem, even though the [State has multiple taxes and fees to generate revenue for transportation investments](#).⁵ Even before creation of the congestion pricing fee, New York's motor vehicle fees, fuel taxes, petroleum business taxes, and other revenues have supported directly work on roads and bridges, while also providing a cross-subsidy to mass transit systems.

These revenues have not kept pace with the needed work for two reasons. First, some tax rates have not been adjusted in decades, reducing purchasing power when accounting for inflation. Second, improving technology has held fuel consumption relatively flat even as miles traveled have increased. Taken together these factors reduced the inflation-adjusted per-mile direct cost to motorists who travel on State roadways 51 percent since 1993.⁶

The State should receive more revenue from users of its roads and bridges. Because fuel taxes and existing fees increasingly are decoupled from the costs of road use, new mechanisms are needed. The innovative option that serves best as a proxy for road use is a VMT fee.

A VMT fee could provide New York with a sustainable funding source to overcome the unmet operating and capital needs of its transportation system. With a wide array of roads and a large number of vehicles, relatively low fee rates could yield significant revenue. As a simple illustrative example in 2016 motorists traveled an estimated 123 billion miles in New York State; an average per-mile fee of 1 cent could yield more than \$1 billion annually.⁷ A VMT fee would charge motorists at a level consistent with use of the network and revenue would not be affected by the increasing fuel efficiency of motor vehicles. Moreover, unlike tolls, a VMT fee levied on all travel is less likely to distort behavior by encouraging drivers to avoid specific routes or crossings. Put simply, a VMT fee adheres more closely to a user-pays principle than existing user fees and offers the capability to match more precisely road use to vehicles by type, region of travel, and time of day.

Overview

A VMT is a mileage-based user fee that collects revenue from road users for each mile they travel. Differing technologies are already used in other programs in the nation to track a vehicle's miles and assess a collection based on the distance traveled. These technologies can record varying details on the duration, location, and timing of travel, depending on the construct of the fee system. Different types and sizes of vehicles can also be charged varying fees in order to further align use in terms of wear and tear on roads with revenues.

Several states are exploring VMT fees; five have completed pilot programs and six more are planning pilot programs.⁸ The U.S. Department of Transportation awarded \$30 million to support state-led efforts to explore user fee models to generate revenue.⁹ An interstate pilot and studies are also underway involving 30 states.¹⁰

Oregon is the most advanced state in implementing a VMT system. Oregon initiated pilot programs in 2006 and 2012 with volunteer participants in each pilot. Under the second pilot, dubbed OReGO, 1,300 volunteer vehicles received onboard devices that catalog the vehicles traveled and bill the driver 1.5 cents per mile traveled. In that pilot private companies manufactured onboard units (OBUs) and worked to develop billing systems, and the Oregon Department of Transportation oversees and administers the program. The pilots have served as valuable tests of the systems, proving that the charges can be implemented successfully. Oregon recently proposed making the program mandatory for all new vehicles beginning in 2026.¹¹

Program Design Components

VMT program design involves three main areas: technological implementation, rate setting, and administration.

Technology

Implementing a VMT fee requires physical infrastructure. The hardware and software must support metering, processing, and enforcement of mileage and fees. The required technology could

be simple reporting by the user or regulators. For example, a registered vehicle owner could be required to self-report miles, or mileage could be reported by a licensed vehicle inspector at required annual inspections. These methods, although simple, are susceptible to fraud and abuse. They also place an active administrative burden on the user and cannot be tailored to account for data beyond simple mileage.

The most common technology used is an OBU. OBUs can be tailored to the program’s design and the user’s needs. The types of data gathered by the OBU and the means of transmission of data vary. The functionality of OBUs depends first on the rate-setting structure (see below for rate-setting options); more intricate rate setting and revenue sharing arrangements will require more advanced technology. The user also may choose an onboard device with additional optional features. The means of installation can also vary. A user may separately procure the device, or a vehicle manufacturer may have agreements with a device manufacturer to install technology in new vehicles, like a vehicle that comes pre-equipped with OnStar. The device can be fixed in the vehicle or removable, like an E-ZPass tag. Table 1 summarizes the basic functions and capabilities of onboard device options.

Table 1: Summary of Features of Onboard Devices

	Device Feature	Description
DATA TRANSMISSION FUNCTIONS	Frequency of Transmission	Transmission of data can be either active or passive. Active devices are able to gather and transmit data to the administrative agency constantly. Passive devices only transmit data when prompted by the owner and/or administrative agency.
	Computational Capability	Devices are either "thin-client" or "thick-client." Thin-client devices record required data and transmit that data to the administrator for processing prior to billing. A thick-client device records the data and has the capability to compute usage and fees prior to transmission.
	Signal Technology	Onboard units can utilize radio frequency, cellular signals, or Global Positioning System (GPS) signals to transmit data. Radio frequency units would function like E-ZPass currently does with a tag and reader. Cellular signals connect the device through available cellular networks similar to a cell phone (or even through a cell phone). GPS transmission offers the most reliable and significant transmission type.
DATA RECORDING FUNCTIONS	Location	Onboard units may be equipped to track a vehicle's specific location, or may simply track mileage like an odometer does. Tracking location requires more sophisticated transmission functionality, but would provide greater data to the administrator that would allow for varying fee rates on specific roadways, tailored revenue-sharing arrangements, and monitoring of traffic patterns and volumes on specific roads.
	Additional Features	The onboard unit can record other data such as speed, emissions, and fuel use. These features may be required or optional for the user. Non-driving data features such as a carfinder functions can be built into the unit for the user's benefit as well.

Source: Sources: Paul Sorensen and others, *Mileage-Based User Fees for Transportation Funding: A Primer for State and Local Decisionmakers* (The RAND Corporation, December 2012); Paul F. Hanley and Jon G. Kuhl, "National Evaluation of Mileage-Based Charges for Drivers," *Transportation Research Record*, no. 2221 (2011) pp. 10-18, and "National Evaluation of a Mileage-based Road User Charge," (University of Iowa, Public Policy Center, 2008); and Puget Sound Regional Council, *Traffic Choices Study* (April 2008); and Robert Bertini and others, *Data Transmission Options For VMT Data And Fee Collection Centers* (November 2002).

Rate setting

Technology decisions are guided partially by the rate-setting approach. The inverse is also true; rate-setting decisions are informed partially by the available and chosen technology. For example, a government may choose to vary charges for miles traveled on rural and urban roadways. The per mile fee may be greater on urban roads to align with the costs of urban congestion, air pollution, and noise pollution, and less in rural areas where transit alternatives are less prevalent. A variable rate-setting system would require an OBU with the capability to track and record a vehicle's position. On the other hand, if a government chooses not to use GPS tracking, the system cannot reliably support a variable rate system.

Privacy concerns may favor options that do not include location data or that calculate all fees within the OBU internally before sending summarized information to data centers. In the future a VMT fee also may be able to rely on in-vehicle telematics, which include the capability to capture travel data and increasingly are standardized in new car models.¹²

The rate-setting structure also can account for the type of vehicle. Different rates may be charged to large trucks, compact cars, and motorcycles. Factors such as weight and wheels impact how much wear a vehicle's travel causes on roads and bridges. It is therefore reasonable to tailor rates to account for the associated differences in depreciation of the assets.

Furthermore, the rate-setting decision is made in conjunction with decisions related to other taxes. The VMT may be in addition to or in lieu of existing taxes and fees. The rate required to generate sufficient revenue to maintain a state of good repair will be affected by the magnitude of other revenues.

Finally, this decision also depends on whether revenue will be shared with local governments that maintain roads. Although the program will be authorized and implemented by the State, a portion of revenues may be shared with local governments. Whereas NYSDOT maintains 15,000 miles of roads, local governments throughout the State own more than 96,000 miles of roads.¹³

Administration

The VMT fee program can be administered in different ways. The State may choose to administer the program through one of its own agencies such as NYSDOT or the New York State Department of Motor Vehicles. Alternatively, a state agency may serve as an oversight entity, with private firms contracted to develop the technology, gather data, and bill drivers. E-ZPass is an example in New York and other states where a private entity works with many agencies, authorities, and organizations to use an interoperable device to collect tolls and fees.¹⁴ OReGo also uses private companies with oversight by the Oregon Department of Transportation.¹⁵

Though retaining activities reduces contracting costs, the State's workforce may not have the capacity to administer an effective billing and customer service center for a VMT fee. Moreover, a private firm may be able to perform such activities more efficiently, especially if it operates

accounts from multiple transportation systems and can achieve economies of scale. Even if outsourced the State would remain responsible for ensuring the retention of auditable records to resolve disputed charges.

Additional Implementation Considerations

Describing the functional components of a VMT system underscores its capabilities but also draws attention to potential challenges. These concerns have dissuaded some governments from exploring VMT fees in the past; however, as technology improves and policymakers experiment with system designs, many of the formidable challenges are overcome more easily. These concerns include opportunities for evasion, high collection costs, drivers' privacy and data security, equity for rural and lower-income motorists, and interoperability with other user fees and other jurisdictions. Crafting a VMT fee in New York requires addressing these concerns.

Preventing Evasion

As with any tax or fee, limiting evasion is a fundamental issue. One of the chief criticisms of New York's existing VMT fee-like revenue source, the truck mileage tax, is that evasion robs it of millions of dollars of revenue and creates an unlevel playing field for operators.¹⁶ The agency administering a VMT fee must ensure motorists are enrolled properly in the program, owners are not tampering with the metering of miles, and drivers who are delinquent can be obligated to pay.

Enrolling users could be the responsibility of the DMV and occur as part of motor vehicle registration. Currently, DMV requires all vehicles registered in the state to receive a safety inspection every 12 months, or when ownership is transferred. Most vehicles also receive an emissions inspection, which involves the DMV endorsing work performed by a private company, either a maintenance shop or dealership.¹⁷ Inspections and registration renewals are additional opportunities to ensure vehicles are participating in the system properly.

Program administrators also need an ability to determine if motorists are metering miles properly and identify signs of tampering. On-road enforcement could be achieved as part of existing traffic stops or with fixed and mobile enforcement stations.¹⁸ Oregon's program requires a default payment of the gas tax if an OBU shows signs of tampering; a similar default payment or fine system in New York could discourage this behavior.¹⁹

Unlike fuel taxes, which are paid by a relatively small number of refineries and distributors, a VMT fee will have millions of customers. While tolling authorities generally assume a "leakage rate"—share of total transactions where tolls are unpaid—of 5 percent to 10 percent, similar assumptions for a state VMT fee would decrease significantly the fee's efficacy.²⁰ Fines for failing to maintain tolling accounts in good standing traditionally have been used to deter nonpayment; however, some scofflaws persist and others are not prosecuted fully.²¹ While suspending drivers licenses has been viewed as overly punitive, tolling authorities can work with DMV and partner with other states to do so in cases of chronic delinquency.

Reducing Collection Costs

A VMT fee will have higher collection costs than the highly efficient fuel taxes for which collection costs are approximately 1 percent of gross receipts nationwide.²² Estimates of collection costs for VMT fees vary. Existing programs have costs as low as 5 percent of total receipts and as high as 15 percent.²³ Even the upper range of VMT fee collection cost estimates are in line with collection costs of toll systems.²⁴ Moreover, collection cost estimates are declining as the technology becomes less expensive and OBUs are superseded by in-vehicle telematics. In addition, it is likely OBUs will become more powerful and less expensive over time. For example, estimates of OBU costs from vendors prepared to supply motorists in the Netherlands fell 25 percent over two years.²⁵

Though a more complex VMT would add to administrative costs, a program could be developed to increase the social benefits to a level great enough to more than compensate. One study showed that by setting different rates for urban and rural driving, a VMT fee designed to decrease highway usage would increase social benefits—largely reduced traffic congestion, emissions, and vehicle collisions—20 percent more than increased fuel taxes to raise the same amount of revenue.²⁶

Protecting Privacy and Data Security

Privacy and data security are two public concerns about a VMT fee.²⁷ Some drivers fear the government or private firms will track motorists' movements and misuse that data. Allaying these fears and fostering public support will require significant outreach about how a VMT fee program works and the safeguards in place to protect citizens' privacy. Data can be aggregated and anonymized so that those responsible for data collection and billing never receive a detailed travel history.

Moreover, many New Yorkers have shown a willingness to provide data about their location through existing tracking technologies in cell phones, GPS-enabled vehicles, street and traffic infrastructure, and insurance trackers. E-ZPass transponders are a semi-passive version of such a system that only provides data when an E-ZPass reader requests it. New Yorkers have shown a willingness to use this system in order to save money on tolls. As of May 2018 E-ZPass market share was more than 95 percent of weekday transactions on Triborough Bridge and Tunnel (TBTA) entities, and in 2017 three-fourths of all New York State Thruway trips were paid by E-ZPass.²⁸

Government may contract with private entities for data services in order to address concerns over privacy and to enlist the expertise of private partners. Private account managers can be contracted to calculate charges and handle billing. New York can engineer a program with strict, specific privacy requirements while still allowing a feasible way to audit bills. Storing or transmitting specific vehicle location or trip data could be prohibited, with account managers instead relying on information about general geographic region and aggregated mileage.

Providing options for compliance is the best way to ensure motorists are comfortable with the privacy protections included in a VMT program. For example, those not wishing to provide any mileage information could pay a flat fee. State law in Oregon prohibits its program from requiring GPS technology and offers motorists a choice of how they report mileage and from whom they

receive reporting devices.²⁹ A similar marketplace in New York could be designed to encourage certain types of recording technology without mandating them.

Ensuring Equity

Equity concerns have two dimensions. One is how a VMT fee would affect individuals at different income levels. A 2012 study of Texas drivers showed that several VMT scenarios—including a flat VMT fee, a tiered VMT fee that encouraged fuel-efficient vehicles, and a fee with higher rates in urban areas than in rural areas—have similar impacts by income group as the gas tax. Under both systems higher-income households pay more because they drive more and drive less fuel-efficient vehicles.³⁰

Second is whether a VMT fee disproportionately would harm residents of rural regions who are more likely to drive longer distances to work, school, or for other essential trips than residents of urban or suburban regions. Studies from Oregon’s pilot programs found that rural drivers were not impacted negatively by a VMT fee relative to the motor fuel tax.³¹ This occurs because even though rural households drive greater distances, they also own less fuel-efficient vehicles. Other studies have shown that VMT programs with differentiated rates for rural and urban miles traveled can ease this concern while discouraging overuse of the urban road network.³²

Coordinating Interoperability

A New York VMT fee must determine how to charge vehicles registered in other states for driving in New York. Programs in Europe show that requiring commercial vehicles registered in other countries to stop at a border crossing to enroll and receive a metering device is possible. Switzerland, Germany, and Austria benefit from shared borders, and haulers based in other countries can register once for multiple programs. However, fees are limited to commercial trucks traveling on selected expressways; applying a similar rule in New York would require significant capital investment in roadside infrastructure, and this concept is likely infeasible for many reasons.³³ For one, the fee may not be collected from vehicles traveling from out of state. This is similar to the current system that solely relies on fuel taxes; fuel may be purchased outside of New York for a vehicle that travels into and through New York without refueling within New York. No fuel tax revenue is collected for that travel currently.

Interoperability challenges will persist even if other states adopt similar VMT fees.³⁴ Data collection and quality assurance needed to reconcile charges across states can be modeled on the E-ZPass system and other existing reciprocity agreements that apportion payments based on travel in participating states. Though current powers and precedents allow a multistate VMT fee system, formal interstate compacts could ease adoption and implementation.³⁵

Implementation Experience in Other States

Five states (Oregon, California, Colorado, Washington, and Minnesota) have launched pilot programs, and two multistate consortiums are studying VMT fees. Some studies are supported by federal grants through the Surface Transportation System Funding Alternatives (STSFAs) program. The interstate group in the western region is the Western Road Use Charge Consortium, and in the eastern region is the I-95 Corridor Coalition.³⁶

The nation's leader in implementing a VMT fee is Oregon. Oregon's efforts are nearly two decades old; the state legislature first established a task force in 2001 to study a VMT construct. Based on this research, a 20-car pilot launched in 2006. The pilot program expanded to a larger voluntary program in 2012. The current program, OReGO, uses a combination of public and private administration to charge participants 1.5 cents per mile traveled. The VMT fee can be adjusted to credit the amount of fuel tax paid at the pump.³⁷

California launched a simulated 1.8 cent per mile VMT fee using varying technologies in 2016 with 5,000 vehicles participating.³⁸ Colorado launched a 1.2 cent per mile fee simulation in 2016 to test multiple types of technology.³⁹ Washington ran a pilot VMT fee program in 2018 and 2019 and is currently studying the results of that pilot.⁴⁰ Minnesota is piloting a program with 500 volunteers that utilizes GPS tracking through a smartphone app.⁴¹

Taken together, several technologies, billing processes, and administrative structures have been piloted successfully. Lessons from these pilots and other pilots across the nation will inform future programs.

Recommendations for Implementation

VMT fees are gaining momentum domestically and internationally as more governments seek ways to charge more effectively for highway use. Though other states have begun pursuing VMT fees, New York has the opportunity to be a leader in transforming the way government funds transportation infrastructure. Five recommendations can make this innovative strategy most effective.

- 1. Phase in implementation in order to allow the public sector to build expertise in a new area of revenue generation.** This would allow New York to mobilize experts in government, academia, and the private sector to implement a program based on best practices. A phased approach also allows the public to become more comfortable with the idea of the program, and the State should devote the resources needed to inform motorists of changes to the way user fees will be collected and how additional user fees will be deployed to improve the transportation network. Despite significant advancements in the technologies needed to implement a complex VMT fee, a phased approach will allow them to mature. It will also give the State adequate time to work with potential vendors to establish a framework and products necessary to ensure a smooth rollout of a new VMT fee.

Based on the experiences of other governments, New York should adopt a multistep implementation with the following stages:

- *Require commercial fleets to transition to a VMT fee.* Truck fees in Germany, Austria, and Switzerland have been justified because of the high costs these heavier vehicles impose on highways and the ease with which they can evade national fuel taxes by purchasing fuel in adjacent nations with lower tax rates. The same justification applies in New York. Starting with commercial fleets, the program could apply to a limited number of participants. Another option would be to reform the existing truck mileage tax; a simpler VMT fee could be substituted and enforcement increased as an early stage of implementation.
- *Create a volunteer program for passenger vehicles.* Following Oregon's example, a volunteer program would provide New York added insights into the implementation of a VMT for personal vehicles. A volunteer program can build public awareness and encourage acceptance while allowing the State to "learn by doing." The State would have to take an active role in engaging volunteers, addressing concerns of dissenting groups, and garnering feedback. This process is particularly important to uncover the interests and concerns about a VMT fee that may be unique to New York State.
- *Provide a multiyear transition.* To yield the most benefits, widespread adoption of a VMT fee is necessary; however, getting it right is more important than getting it quickly. New York should allow ample time to establish the soft and hard infrastructure necessary to implement a near-universal program. During the transition to a VMT, the State would remain predominantly reliant on existing fuel taxes and other revenue sources for transportation and transit revenue.

In Oregon the initial pilot programs were developed on the basis that the VMT would replace fuel taxes. To encourage participation, the pilots were structured such that the fuel taxes could be credited against the VMT fee cost when a compatible device was installed in the vehicle.⁴² In New York State, ideally VMT fee revenues would be used as a supplement to existing dedicated transportation revenues. To encourage early adoption by motorists, a partial fuel tax or motor vehicle fee credit, an increase in the fuel tax or motor vehicle fee with an exemption for VMT fee participants, or reduced rates for early adopters may be considered.

2. **Maintain flexibility to accommodate new technology.** Much like E-ZPass, a widespread VMT fee system in New York could become a model for others to follow. However, the State should remain technologically agnostic and not commit to a single, proprietary platform. This allows a VMT fee system to adapt to the most up-to-date technology, procure services and products from multiple providers if necessary, and conform to the public's evolving policy preferences. Oregon uses a flexible system that can receive and process data from multiple private sector providers; if a new account manager wants to enter the market, the Oregon Department of Transportation has clear requirements to integrate a new system.

As some other states—and possibly the federal government—consider transitioning from fuel taxes to VMT fees, integrating with other states' programs will be important. Being a leader

in this policy area would be a positive, as it would help set expectations for others to follow; an inflexible technological framework could thwart future intergovernmental cooperation. New York State will soon be implementing a congestion pricing system in Manhattan's central business district. Congestion pricing and VMT fees share a similar general goal: charging road users equitably to fund transportation and mass transit. Implementation of the congestion pricing system and the required technology may facilitate adoption of a VMT fee.

- 3. Establish rates that vary by type of vehicle and location.** Higher rates for urban than rural miles should be established with justification that negative effects of air pollution and traffic congestion are greater for those miles and that cross-subsidies to transit from these miles driven help improve mass transportation alternatives. Rates for heavier vehicles should be greater because the added wear and tear imposed on the road and bridge network require greater resources to mitigate.
- 4. Execute a clear and transparent rate-setting process.** Whether using a flat VMT fee rate or a more complex multirate system, the rate-setting process should be clear and transparent. Motorists should know how, when, and at what rate a VMT fee is being imposed. A VMT fee system that charges different rates by type of vehicle, region of travel, or time of day should emphasize simplicity so that drivers understand the rules and can make informed travel decisions.
- 5. Use the VMT fee as an addition to existing sources.** VMT fees should help remedy the mismatch between available highway and transit revenues and needed annual expenditures for operations and repairs. Initial implementation should have VMT fees as additional revenue with the design modified over the longer run to reduce reliance on the likely decreasing motor fuel tax revenue. As VMT revenues become more reliable, the snowballing costs of deferred maintenance on transportation and transit assets will subside. The implementation of the VMT fee may allow the State to consider whether a portion of fuel tax receipts should support initiatives related to the negative environmental and health externalities of motor fuel consumption.

Conclusion

The importance of New York's highway system cannot be overstated. Yet New York undercharges motorists for use of an expansive system and for the social costs of traffic congestion, air pollution, and vehicular accidents. The result is a fiscal imbalance that causes deferred maintenance and rehabilitation of vital state facilities.

In the past fuel taxes were appealing from a policy perspective as they served as a proxy for miles traveled on state infrastructure and can be collected efficiently. As fuel economy has increased and all-electric vehicles have recently emerged, the relationship between use of the highway network and gallons of fuel consumed has decoupled.

Seeking ways to charge fairly for use of its highway system, New York should look to new sources. The authorization of congestion pricing is a noteworthy step in this direction; elected officials should continue in a national leadership role by planning for a vehicle-miles traveled fee. Though new to New York State, domestic and international examples provide a path forward and models to improve upon. A phased approach that prioritizes an adaptable platform and a transparent, variable rate-setting process should begin now so that a well-vetted system can be in place sooner rather than later.

ENDNOTES

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