

State of California  
Air Resources Board

# **Proposed Clean Miles Standard Regulation**

## **Staff Report: Initial Statement of Reasons**

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## List of Acronyms

AB	Assembly Bill
ACC	Advanced Clean Cars
BEV	Battery electric vehicle
Cal-ITP	California Integrated Travel Program
CARB	California Air Resources Board
CEC	California Energy Commission
CNG	Compressed natural gas
CO <sub>2</sub>	Carbon dioxide
COVID-19	Coronavirus Disease 2019
CPUC	California Public Utilities Commission
CVRP	Clean Vehicle Rebate Project
DAC	Disadvantaged community
DC	Direct current
U.S. DOE	United States Department of Energy
EMFAC	EMission FACtor, a model that estimates on-road emissions in California
eVMT	Electric vehicle miles traveled
EV	Electric vehicle
EVSP	Electric vehicle service provider
FCEV	Fuel cell electric vehicle
GHG	Greenhouse gas
ICE	Internal combustion engine
LCFS	Low Carbon Fuel Standard
LDT	Light-duty truck
LEV III	Third generation Low Emission Vehicle program adopted in 2012
MMT	Million metric tons
MY	Model year
NO <sub>x</sub>	Nitrogen oxides
PC	Passenger car
PHEV	Plug-in hybrid electric vehicle
PM	Particulate matter
PMT	Passenger miles traveled
SB	Senate Bill
SRIA	Standardized Regulatory Impact Analysis
TAZ	Traffic analysis zone
TNC	Transportation network company
TOU	Time-of-use

U.S. EPA	United States Environmental Protection Agency
VIN	Vehicle identification number
VMT	Vehicle miles traveled
WAV	Wheelchair accessible vehicle
WTT	Well-to-tank
WTW	Well-to-wheel
ZEV	Zero-emission vehicle



## Executive Summary

Although California has made progress with reducing emissions, there is still a long road ahead. Highlighted in the Senate Bill (SB) 375 2018 Progress Report, California has hit its 2020 climate target ahead of schedule due to strong performance in the energy sector, but meeting future targets will require a greater emphasis on the transportation sector.<sup>1</sup> With greenhouse gas (GHG) emissions continuing to rise despite increasingly stringent emissions standards and decreases in the carbon content of fuel, California will not achieve the necessary greenhouse gas emissions reductions to meet mandates for 2030 and beyond without additional measures.

Specifically, CARB's 2017 Climate Change Scoping Plan identifies that reductions in single-occupancy vehicle miles traveled (VMT) is necessary to achieve the statewide emissions target of 40 percent below 1990 levels by 2030.<sup>2</sup> Even more will be needed to achieve Governor Brown's carbon neutrality goal by 2045.<sup>3</sup> Transitioning the transportation sector to zero-emission vehicles (ZEVs) and reducing vehicle miles traveled are critical to achieving California's health protection goals, minimizing air pollution exposure throughout the state but particularly in our most impacted communities, and mitigating climate change impacts.<sup>4</sup> The reduction of GHG emissions is important for mitigating the worst effects of climate change in California, including impacts to agriculture and livestock from rising temperatures and extreme heat, which can lead to direct health effects, reduced mountain snowpack needed for water storage, and prolonged drought.<sup>5</sup>

The transportation sector is evolving to meet the needs of Californians. Transportation network companies (TNCs) provide on-demand rides through a technology-based platform by connecting passengers with drivers using their personal or rental vehicles.

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<sup>1</sup> California Air Resources Board, Senate Bill 375 Progress Report, 2018 (web link: [https://ww2.arb.ca.gov/sites/default/files/2018-11/Final2018Report\\_SB150\\_112618\\_02\\_Report.pdf](https://ww2.arb.ca.gov/sites/default/files/2018-11/Final2018Report_SB150_112618_02_Report.pdf))

<sup>2</sup> California Air Resources Board, California's 2018 Climate Change Scoping Plan, 2017 (web link: [https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/scoping\\_plan\\_2017.pdf](https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/scoping_plan_2017.pdf))

<sup>3</sup> Executive Order B-55-18. State of California Executive Order signed by Governor Edmund G. (Jerry) Brown September 10, 2018 (web link: <https://www.ca.gov/archive/gov39/wp-content/uploads/2018/09/9.10.18-Executive-Order.pdf>).

<sup>4</sup> California Air Resources Board, Draft 2020 Mobile Source Strategy (web link: [https://ww2.arb.ca.gov/sites/default/files/2020-11/Draft\\_2020\\_Mobile\\_Source\\_Strategy.pdf](https://ww2.arb.ca.gov/sites/default/files/2020-11/Draft_2020_Mobile_Source_Strategy.pdf), accessed 1/20/21).

<sup>5</sup> California's Fourth Climate Change Assessment: <https://climateassessment.ca.gov/>

Ride-hailing services offered by TNCs have grown at a rapid pace since they entered the California market in 2012. The TNC sector is the fastest growing sector relative to other categories of commercial passenger vehicle fleets regulated by the California Public Utilities Commission (CPUC). According to CPUC historical data and 2018 data CARB staff analyzed, the TNC VMT share grew from 0.05 percent of the total California light-duty VMT in 2014 to 1.2 percent in 2018.<sup>6</sup> Two companies, Lyft and Uber account for the overwhelming majority of the VMT from this industry. Although their VMT share may currently seem insignificant, this sector has potential for further growth.

The TNCs are well-positioned to help state and local agencies meet air quality and climate goals through electrification. In fact, the two largest TNCs in California, Uber and Lyft, have already been at the forefront of experimenting with electrification through various pilot programs in the U.S. and globally. Additionally, VMT reduction through pooling, reducing miles driven without passengers (deadhead miles), and mode shifting to active transportation and transit will ensure that TNCs become a more sustainable transportation option.

Lyft, with one-third of the market share in California, has implemented successful electric vehicle (EV) rental pilots in Seattle and Atlanta in 2019, followed by a full deployment of EV rentals in Denver through its ExpressDrive rental partner program in which it also partners with charging network providers to include unlimited charging built into the rental fees.<sup>7</sup> In June 2020, Lyft publicly announced a company-wide goal of achieving 100 percent electric vehicles in their fleet by 2030 while acknowledging that cooperative action is needed amongst industry, government entities, and non-profit organizations to overcome (according to Lyft) the high vehicle cost and enhance access to charging.<sup>8</sup> The proposed Clean Miles Standard (CMS) regulation reinforces Lyft's electrification goals.

Uber, currently with two-thirds of the ride-hailing market share in California, conducted a year-long pilot program called the EV Champions Initiative in seven California cities, in which varying subsidies and benefits were given to drivers with

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<sup>6</sup> CARB, 2019. Clean Miles Standard 2018 Base Year Emissions Inventory Report

<sup>7</sup> <https://www.lyft.com/blog/posts/making-cities-more-liveable-with-electric-vehicles>, <https://www.lyft.com/blog/posts/lyft-denver-ev-2019>, accessed August 3, 2020.

<sup>8</sup> Lyft announcement. June 17, 2020 (<https://www.lyft.com/blog/posts/leading-the-transition-to-zero-emissions>, accessed July 22, 2020).

EVs.<sup>9</sup> In London, Uber assesses a 15 pence (approximately 20 cents USD) Clean Air Fee per mile on every trip within a certain city boundary, which is applied toward a fund that drivers can access for assistance in purchasing an EV.<sup>10</sup> In September 2020, Uber also announced a company-wide goal of achieving 100 percent electric vehicles in major urban areas by 2030 in the US, Canada and Europe.<sup>11</sup> The company is also working with strategic partners to identify local policies that can help enable this transition.

Senate Bill 1014 (Skinner, Stats. 2018, ch. 369)—the Clean Miles Standard and Incentive Program of 2018—directs CARB to adopt and the CPUC to implement the CMS program to put environmental requirements in place on TNCs in California.<sup>12</sup> The proposed CMS regulation is a first-of-its-kind, in-use light-duty fleet rule for reducing emissions in the TNC sector. Electrification targets are in percent electric vehicle miles traveled (eVMT) and GHG emission targets are in grams of CO<sub>2</sub> per passenger-mile-traveled (g CO<sub>2</sub>/PMT). The required targets encourage TNCs to increase miles driven by cleaner vehicles, including ZEVs. The program also encourages reducing VMT relative to passenger miles traveled (PMT) through strategies such as increasing pooled (or shared) rides and decreasing deadhead miles. The proposed regulation will support active transport and public transit by providing regulatory compliance credits when TNCs facilitate those modes of travel. The electrification and GHG targets are shown in Table ES-1, and specific compliance requirements are described in detail later in this staff report.

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<sup>9</sup> Los Angeles Times, *Uber begins a push to get its drivers into electric cars, June 19, 2018* (<https://www.latimes.com/business/technology/la-fi-tn-uber-electric-vehicles-20180619-story.html>, accessed August 3, 2020).

<sup>10</sup> Uber, *The Clean Air Plan* (<https://www.uber.com/gb/en/u/drive-journey-to-electric/> accessed August 3, 2020).

<sup>11</sup> Uber, *Driving a Green Recovery*, September 8, 2020 (<https://www.uber.com/newsroom/driving-a-green-recovery/>, accessed September 22, 2020).

<sup>12</sup> California Legislature, Senate Bill 1014, signed September 13, 2018 ([https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill\\_id=201720180SB1014](https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB1014)).

Table ES-1. Proposed annual percent eVMT and GHG targets

Calendar Year	Percent eVMT Target	g CO <sub>2</sub> / PMT Target
2023	2%	252
2024	4%	237
2025	13%	207
2026	30%	161
2027	50%	110
2028	65%	69
2029	80%	30
2030+	90%	0

To assess cost and emission impacts, CARB staff modeled compliance with the GHG target because it is the more stringent of the two requirements. The GHG target in 2030 is equivalent to a 100 percent electric vehicle miles traveled (eVMT) in TNC fleets, and was used to estimate reductions in GHG emissions, criteria emissions such as nitrogen oxides (NO<sub>x</sub>) and particulate matter (PM), and health costs for California residents. The specific environmental benefits from this proposed regulation are shown in Table ES-2.

Table ES-2: Cumulative statewide emission reductions from the proposed regulation

Years	PM <sub>2.5</sub> (tons)	NO <sub>x</sub> (tons)	GHG (MMT CO <sub>2</sub> )
2023-2031	93.21	298.03	1.81

In addition to the cumulative emissions shown in Table ES-2, CARB staff estimate the proposed regulation would result in a reduction of 0.36 MMT of CO<sub>2</sub> in the year 2030. Emission reductions in Table ES-2 are estimated based on an assumption of 100 percent eVMT and do not include emission reductions that could come from implementing VMT reduction strategies for compliance with the GHG targets (e.g., pooling and deadhead mile reduction).

To comply with this regulation, TNCs need to work with their drivers to enable ZEV adoption. While we do not know the exact strategies TNCs will use, nor how the TNC business models may evolve in the future, staff have taken a conservative approach in selecting annual targets by assuming that drivers would acquire ZEVs and that low-income drivers, particularly those who live in communities of concern, would acquire ZEVs. Any the associated cost varies depending on what actions TNCs take to ensure

they are meeting the regulatory targets. To reduce the risk of adverse impacts on drivers, staff made the assumption that the electrification targets selected must result in a zero net cost to the driver over a period of one year, at most. In general, staff expect higher-mileage TNC drivers to switch to ZEVs earlier because they are more likely to see cost benefits from switching sooner than other lower-mileage drivers. Note that under the proposed targets—and depending on how TNCs choose to comply with the proposed regulation—a large portion of TNC drivers may not need to switch to ZEVs by 2030. [incentive programs]

As will be described in this staff report, the cost optimization model was used to set the electrification target. Staff developed total costs for a year as inputs into the model and the output is the percent of vehicles that could switch to a ZEV with no additional cost to the driver. This logic in the models leads to the drivers with highest annual service miles and the greater fuel use in the TNC fleet to have an incentive to switch to ZEV based on cost optimization. Running the model for every year, staff came up with the electrification target of 90 percent eVMT. The electrification target alone would require less than half of the TNC vehicles to switch to ZEVs in 2030. However, for the GHG target, TNCs could meet the target by fully electrifying the TNC fleet, projected to be over 750,000 vehicles in California by 2030. Table ES-3 shows estimates of the percent of ZEVs needed in the TNC each compliance year, assuming that only electrification is used for compliance with the GHG targets.

Table ES-3: Percent of ZEVs in TNC fleet for compliance with the GHG targets

Year	2023	2024	2025	2026	2027	2028	2029	2030
Percent of Vehicles	2%	3%	6%	13%	23%	32%	44%	100%

Staff also proposes allowing TNCs to use optional credits for actions that support transit and active transportation. This will encourage VMT reduction strategies through TNC-mobility partnerships rather than eroding transit market share, a trend currently occurring in urban areas.<sup>13</sup> It will also help to support transportation alternatives, which is important for lower-income residents that do not have access to TNC services or cannot afford their own vehicle.

In addition to meeting the required targets, the proposed regulation requires TNCs to submit a compliance plan every two years, beginning January 1, 2022, that outlines

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<sup>13</sup> Clewlow, Regina R., and Gouri Shankar Mishra. "Disruptive transportation: The adoption, utilization, and impacts of ride-hailing in the United States." University of California, Davis, Institute of Transportation Studies, Davis, CA, Research Report UCD-ITS-RR-17-07 (2017).

the strategies TNCs plan to use to meet the electrification and GHG targets for the subsequent two compliance years. Additionally, on an annual basis, TNCs must submit a compliance summary report that includes the company-wide percent eVMT and g CO<sub>2</sub>/PMT for each prior compliance year. This report would be used by CPUC to evaluate compliance and enforce the regulatory targets.

The assumption in the cost model of a one year payback period was determined to be a short timeframe that would make the switch to electric vehicles feasible for most drivers. But staff recognize that some drivers, particularly those that are lower income and do not have easy access to funds for the incremental cost of a new or used ZEV, still will have challenges. With the exemption from AB 5 labor rules granted to TNC companies in the adoption of Proposition 22 in 2020, there is no assurance TNCs will pay drivers for the extra costs of electrification.

However, staff are encouraged by TNC pilot projects to experiment with new business models for EV rental opportunities, and also that some incentive programs are available to lower income drivers (discussed in Chapter VIII of this staff report). It is possible incentive programs will evolve to provide more opportunities for lower income TNC drivers, but will be considered in separate program proceedings.

## I. Introduction and Background

The proposed regulation is the first in-use, light-duty fleet regulation developed by the California Air Resources Board (CARB), and the first to address environmental requirements for ride-hailing services specifically. Since 2012, the California Public Utilities Commission (CPUC) has permitted TNCs to operate on the streets of California. SB 1014 gives CARB authority to adopt an emissions regulation for TNCs; however, CPUC is tasked with implementing the regulation given its existing oversight role. This chapter provides a brief history of SB 1014 and existing regulatory authority over TNCs, presents key TNC data statistics, and highlights public outreach conducted for this proposed regulation.

### A. Regulatory Authority

#### *Charter Party Carriers' Act*

The CPUC, through the Passenger Charter-party Carriers' Act (CPC Act), makes it unlawful for a charter-party carrier to operate without first obtaining a permit or certificate from the CPUC, except as specified. In 2012, as TNC services came into the market, CPUC opened Rulemaking (R.) 12-12-011 to address new online-enabled forms of transportation and adopted Decision (D.)13-09-045, which created a new category of charter-party carriers of passengers called transportation network companies. Following the CPUC decision, in 2014, the California Legislature amended the Public Utilities Code to clarify these services in statute, defining TNCs as organizations "operating in California that provide pre-arranged transportation services for compensation using an online-enabled application or platform to connect passengers with drivers using a personal vehicle."<sup>14</sup>

Under the CPC Act, the CPUC regulates TNC insurance requirements, driver background checks, fees to support expansion of on-demand wheelchair-accessible vehicles (WAVs), and TNC permit fees.<sup>15,16</sup> The CPUC institutes annual reporting requirements for TNCs pursuant to D.13-09-045 and D.16-04-041.<sup>17</sup>

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<sup>14</sup> Public Utilities Code §5431(a)

<sup>15</sup> CPUC Decision 13-09-045

<sup>16</sup> Public Utilities Code Division 2, Chapter 8, Article 7, §5431(c)

<sup>17</sup> CPUC Required Reports for TNCs: <https://www.cpuc.ca.gov/General.aspx?id=3989>

## **Senate Bill 1014**

In September 2018, Governor Brown signed into law SB 1014 (Skinner, Chapter 369), which established the Clean Miles Standard and Incentive Program (CMS). The law directs CARB to develop, and the CPUC to implement, annual emission-related targets to reduce GHG emissions for TNCs.<sup>18</sup> The statute also establishes a timeline for the development of the regulation. The first step was to establish a GHG emission baseline for TNCs on a per-passenger-mile basis by January 1, 2020, which CARB completed as described further below. The second step is for CARB to adopt targets by January 1, 2021, which this proposed rulemaking is intended to accomplish.<sup>19</sup> Upon adoption of the targets, the third major step is for the CPUC to establish penalties for non-compliance and begin implementation by 2023.

The statute requires CARB to adopt two targets for vehicles used on the online-enabled applications or platforms by TNCs. The first is decreasing annual GHG targets in the metric of gram-CO<sub>2</sub> per passenger-mile-traveled (g CO<sub>2</sub>/PMT) and the second is increasing passenger miles traveled using zero-emission vehicles. Staff has developed electrification targets in the metric of percent eVMT to meet this second requirement. The statute encourages CARB to consider other passenger miles traveled by zero-emission means, including walking, biking, and scooting that are facilitated by the TNC application (app), as well as supporting the use of transit. The statute also provides that the CPUC shall minimize impacts on low- and moderate- income drivers.

CARB and CPUC staff formed an interagency team and began working collaboratively on the proposed CMS regulation immediately following the passage of SB 1014 in late 2018. The team then began engaging stakeholders to begin the regulatory development process.

### **B. TNC Description and Summary Statistics**

The first statutory requirement set forth by SB 1014 was for CARB to establish an emissions inventory for the TNC sector by January 2020 using the base year of 2018 for TNC activity in California. CARB and CPUC staff jointly requested trip-level data from the TNCs to establish the 2018 base year emissions inventory. CARB staff cleaned and analyzed the 2018 TNC dataset, with support from the major TNCs, which included over 1.4 billion trip records. Results of the emissions inventory, assumptions,

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<sup>18</sup> Senate Bill 1014

<sup>19</sup> The adoption of the proposed regulation is delayed to early summer 2021 due to an iterative process of making changes to the regulation design. Changes were the result of critical feedback from stakeholders and internal CARB management.



and methodology are summarized in a technical document, the Clean Miles Standard 2018 Base Year Inventory Report (Base Year Report), provided in Appendix B.

CARB staff estimates that in 2018, the TNC fleet emitted approximately 301 g CO<sub>2</sub>/PMT. Analysis of the 2018 data showed that the TNC fleet is relatively more fuel efficient than the California on-road fleet due to having a higher fraction of newer model year (MY) vehicles, higher percentage of passenger cars relative to light trucks, and a higher percentage of hybrid vehicles compared to the California general fleet. However, the TNC fleet's emissions, on a per-passenger mile basis, are about 50 percent higher than the statewide average of 203 g CO<sub>2</sub>/PMT. The TNC fleet's emissions are higher primarily due to the difference in deadhead miles, which are miles driven without passengers, and lower average passenger occupancy.

In a public Board hearing on January 23, 2020, CARB staff presented the 2018 base year emissions and preliminary regulation design to the Board. At the Board hearing, the Board adopted a resolution that established guiding principles for developing the CMS program in accordance with SB 1014.<sup>20</sup> The proposed regulation encourages TNC fleets to provide clean mobility options, including shared rides (or pooling), zero-emission vehicles (ZEVs), enabling connections to transit, and investing in active transportation, in order to promote the use of ZEVs and reduce VMT.

### **C. The Need to Encourage Ride-Hailing Companies to Help Drivers Reduce Costs**

Under the current business model, the majority of the TNC drivers bring their own vehicles to the platform and may be the ones to pay for the switch to a ZEV in the future. Although the electrification targets are set using a model with cost savings realized within one year, drivers must still come up with the initial financial capital needed to acquire a ZEV. It is possible the majority of these drivers come from communities of concern and therefore may have a difficult time with the cost of purchasing or leasing a ZEV. To help overcome the capital cost barrier to driving a ZEV, TNCs are beginning to offer ZEVs as weekly rentals through their rental partners.

Given this risk for lower-income drivers, and the exemption granted to TNCs from the Assembly Bill (AB) 5 (Stats. 2019, ch. 296) labor law following the passage of Proposition 22 (November 2020), CARB staff have taken a conservative approach in selecting annual targets to reduce the risk to drivers. As will be described in Chapter III Section A.3, the proposed electrification requirements scale up slowly in the early years as electric vehicle costs are declining. The analysis to support this also showed that substantial cost-savings can occur for higher-mileage drivers who operate a ZEV

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<sup>20</sup> CARB Resolution 20-4: <https://ww2.arb.ca.gov/board-resolutions-2020>

for longer than a year. To enable the purchase of the electric vehicle for drivers (particularly lower-income drivers), staff have summarized existing incentives available to these drivers in the Environmental Justice Chapter VIII, Table 16.

#### **D. Summary of Public Process**

CARB staff conducted a number of working group meetings, public workshops, and individual stakeholder meetings throughout the development of the proposed regulation, beginning with an initial workshop in February 2019. Staff solicited feedback from stakeholders at every major step of the process and received numerous comments and questions regarding the content that was shared, including proposed targets, credit options, various assumptions that were used in the modeling tools, and regulatory flexibilities. Dates and objectives of the public events can be found in Chapter XI of this report. Staff from the CPUC participated in all of the public stakeholder events to ensure they were familiar with the CARB regulatory development process, and to help answer questions for the public about the pending CPUC actions necessary to prepare for adoption and implementation of the program.<sup>21</sup>

## **II. The Problem that the Proposal is Intended to Address**

The proposed regulation will decrease GHG emissions, criteria pollutant emissions, such as NO<sub>x</sub> and PM<sub>2.5</sub>, which in turn will help California meet its climate and air quality goals. These emission reductions are described further in Chapter V. Given the way the targets are structured, the proposed regulation may also decrease VMT and may support transportation alternatives. In addition to emission reductions, the proposed regulation may also increase awareness of ZEVs with more Californians experiencing the technology through ride-hailing trips.

### **A. The Need to Reduce Greenhouse Gas Emissions**

The California Global Warming Solutions Act of 2006—Assembly Bill (AB) 32 (Stats. 2006, ch. 488)—designates CARB as the regulatory agency to monitor and regulate sources of GHG emissions in the State of California. AB 32 requires CARB to reduce GHG emissions in the state to 1990 levels by 2020. With the passage of SB 32 (Stats. 2016, ch. 249) in 2016, a longer-term GHG reduction requirement was

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<sup>21</sup> Clean Miles Standard meetings and workshops: <https://ww2.arb.ca.gov/our-work/programs/clean-miles-standard/clean-miles-standard-meetings-workshops>

established at 40 percent below 1990 levels by 2030. Subsequently, Executive Order B-55-18 established a statewide goal of achieving carbon neutrality no later than 2045.

Reducing GHG emission from TNC operations is important to meeting the State's climate goals. The transportation sector accounts for approximately 50 percent of greenhouse gas (GHG) emissions in California when accounting for direct vehicle emissions and upstream fuel production facility emissions, with light-duty vehicles comprising 70 percent of the transportation sector's direct vehicle emissions. Further, transportation sector emissions are increasing, despite vehicle emissions standards, amplifying the need for new actions with mobility. The TNC sector may be small now, but it is the fastest growing sector relative to other categories of commercial passenger vehicle fleets regulated by the CPUC.<sup>22</sup> BloombergNEF projects the global VMT share of TNCs to grow from five percent today to 19 percent by 2040.<sup>23</sup> Processing data from CPUC for California, CARB staff estimates a 40 percent growth of TNCs statewide by 2030 relative to their market share in 2018.

### ***Zero Emission Vehicle Adoption and Awareness***

Reducing GHG emissions from vehicles can also foster healthier and more equitable and sustainable communities. Broadly implementing zero-emission technologies is necessary to effectively address complex air quality and climate protection issues. A recent study found that the potential emission reductions from these fleets are approximately three times higher for electric vehicles in ride-hailing fleets compared to a conventional vehicle in California today depending on the energy fuel mix in the grid and vehicle usage.<sup>24</sup> One of the biggest barriers to the expansion of the ZEV market overall in California is the lack of ZEV awareness. Because each ride-hailing vehicle provide rides to numerous passengers there is an opportunity for TNCs to help facilitate education and outreach about ZEVs to riders, which can have secondary benefits of informing non-TNC vehicle owners about ZEVs.<sup>25</sup>

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<sup>22</sup> CPUC. *Electrifying the Ride-sourcing Sector in California* (2018). (TNC emissions compared to 2015 data, the most recent year California transportation sector data was available at time of report.)

<sup>23</sup> McKerracher, Colin, et al. "Electric Vehicle Outlook 2019." *Bloomberg New Energy Finance* (2019).

<sup>24</sup> Jenn, Alan. "Emissions benefits of electric vehicles in Uber and Lyft ride-hailing services." *Nature Energy* 5.7 (2020): 520-525.

<sup>25</sup> ICCT, *Emerging policy approaches to electrify ride-hailing in the United States*  
[https://theicct.org/sites/default/files/publications/EV\\_ridehailing\\_policy\\_approaches\\_20190108.pdf](https://theicct.org/sites/default/files/publications/EV_ridehailing_policy_approaches_20190108.pdf)

## **Autonomous Vehicle Fleets**

Advancement in autonomous vehicle (AV) technology has brought about new pilot programs overseen by the CPUC. In the initial phase, AV development companies were permitted to test their AVs with a safety driver in the vehicle or with remote operators, while providing passenger service as long as the company does not accept payment. Now in the current phase, AVs may be tested on California roads while providing passenger service to the public for compensation.<sup>26,27</sup> Per SB 1014, the Clean Miles Standard program may regulate AV services providing fare-based shared rides. Under the proposed regulation, all ride-hailing services, including those provided by AV services, must meet the targets once their operation meets the 5 million VMT threshold, as described in Chapter IV, section A of this report. Currently, there are no AV companies operating near that scale. Staff will continue to follow new developments in AV technology and deployment, as AV companies operating rideshare services could be subject to the CMS targets if their operations result in greater than 5 million VMT annually.

### **B. Reduce Vehicle Miles Traveled by Increasing Occupancy and Supporting Alternate Modes of Transportation**

Reducing VMT, as noted in the 2017 Scoping Plan and the Mobile Source Strategy<sup>28</sup>, is critical to help reduce transportation sector GHG emissions as it helps reduce associated emissions. Specifically, CARB's 2017 Scoping Plan identifies reduction in growth of single-occupancy vehicle travel as necessary to achieve the statewide target of 40 percent below 1990 level emissions by 2030.<sup>29</sup> As these services grow globally and in California, there are larger VMT reductions to be had from this sector. The proposed regulation establishes targets that encourage the companies to develop innovative ways to reduce VMT such as reducing deadhead miles and increasing pooling.

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<sup>26</sup> CPUC, Drivered AV Passenger Service and Driverless AV Passenger Service pilots: <https://www.cpuc.ca.gov/avcpilotinfo/>

<sup>27</sup> <https://www.smartcitiesdive.com/news/california-regulator-approves-fare-based-av-services/589526/#:~:text=The%20California%20Public%20Utilities%20Commission,AV%20trips%20for%20the%20public>, accessed December 12, 2020.

<sup>28</sup> California Air Resources Board. Draft 2020 Mobile Source Strategy (<https://ww2.arb.ca.gov/resources/documents/2020-mobile-source-strategy>).

<sup>29</sup> California Air Resources Board. California's 2017 Climate Change Scoping Plan: The Strategy for Achieving California's 2030 Greenhouse Gas Target, November 2017 ([https://www.arb.ca.gov/cc/scopingplan/scoping\\_plan\\_2017.pdf](https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf)).

Along with the goal of reducing emissions, local jurisdictions within and outside of California have raised concerns that increased vehicle congestion in dense areas could at least partially be attributed to TNC growth.<sup>30,31</sup> A reduction in VMT in urban areas could mitigate congestion, since TNC activity is highest in urban areas.

Some research suggests the presence of TNCs tend to reduce use of other travel modes such as active transportation and mass transit, while other studies suggest TNCs actually complement mass transit. Staff do know that increased use of active transportation and transit plays an important role in reducing congestion. The proposed regulation will encourage TNCs to support modes of travel other than passenger vehicles through these optional credits. Optional credits are further discussed in Chapter III Section C.

### **III. Overview of Proposed Actions**

This chapter provides an overview of the proposed electrification and GHG targets. The chapter describes the reasoning behind the annual electrification and greenhouse gas targets while Chapter IV later provides further detail on each proposed provision and section of the California Code of Regulations.

Since SB 1014 was put into statute, there have been several external factors that will have implications for the industry's business model. However, many of the potential impacts were not known at the time staff were developing the proposed regulation and may not be known for some time. CARB is aware that events such as the COVID-19 pandemic, and the ensuing economic recession, have had large impacts on the demand for ride-hailing services, and have forced the companies to stop pooling services temporarily. Additionally, the passage of California's AB 5 gig economy labor law, and Proposition 22 (to revise AB 5) may have a significant impact on the TNC business model that could affect cost-sharing with drivers. Although staff cannot quantify the specific impacts from these factors, the proposed regulation has taken the uncertainty into account by incorporating a slow ramp up in the targets for the beginning years of compliance to provide industry time to adjust.

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<sup>30</sup> Schaller, Bruce. 2017. Unsustainable? The growth of app-based ride services and traffic travel and the future of NYC.

<sup>31</sup> SFCTA 2018 Final Report - TNC's and Congestion: [https://www.sfcta.org/sites/default/files/2019-05/TNCs\\_Congestion\\_Report\\_181015\\_Finals.pdf](https://www.sfcta.org/sites/default/files/2019-05/TNCs_Congestion_Report_181015_Finals.pdf)

## **A. Electrification Target**

### **1. Background**

To develop the annual electrification targets, staff first assessed the market in which these companies are operating and the availability of ZEVs suitable for ride-hailing. Before developing standards, the feasibility of meeting the standards was assessed by evaluating if the ZEVs available meet the needs of ride-hailing fleets. This section provides a summary of the vehicles available in the California fleet, and if the vehicles available are applicable for TNC use. Existing electric vehicle purchase incentive programs available to drivers in the ride-hailing industry are also highlighted.

#### ***ZEV Model Availability and Vehicle Ranges***

One important question to answer: During the time frame of the proposed regulation, are a variety of ZEVs available in the California fleet and do they have a sufficient driving range? Staff are confident that ZEV technology is available in a variety of passenger vehicle classifications. This ensures TNC drivers have choices in the market to suit their preferred needs, including demands for TNC services. Figure 1 below shows ZEV models on the market today by vehicle classification. The mid-size classification meets the needs of many TNC riders for single-occupancy trips, but larger sedans as well as SUVs are desirable for pooling trips. As shown in Figure 1, a range of ZEV models are available for TNC drivers today and more models are expected for the California market in the near future.

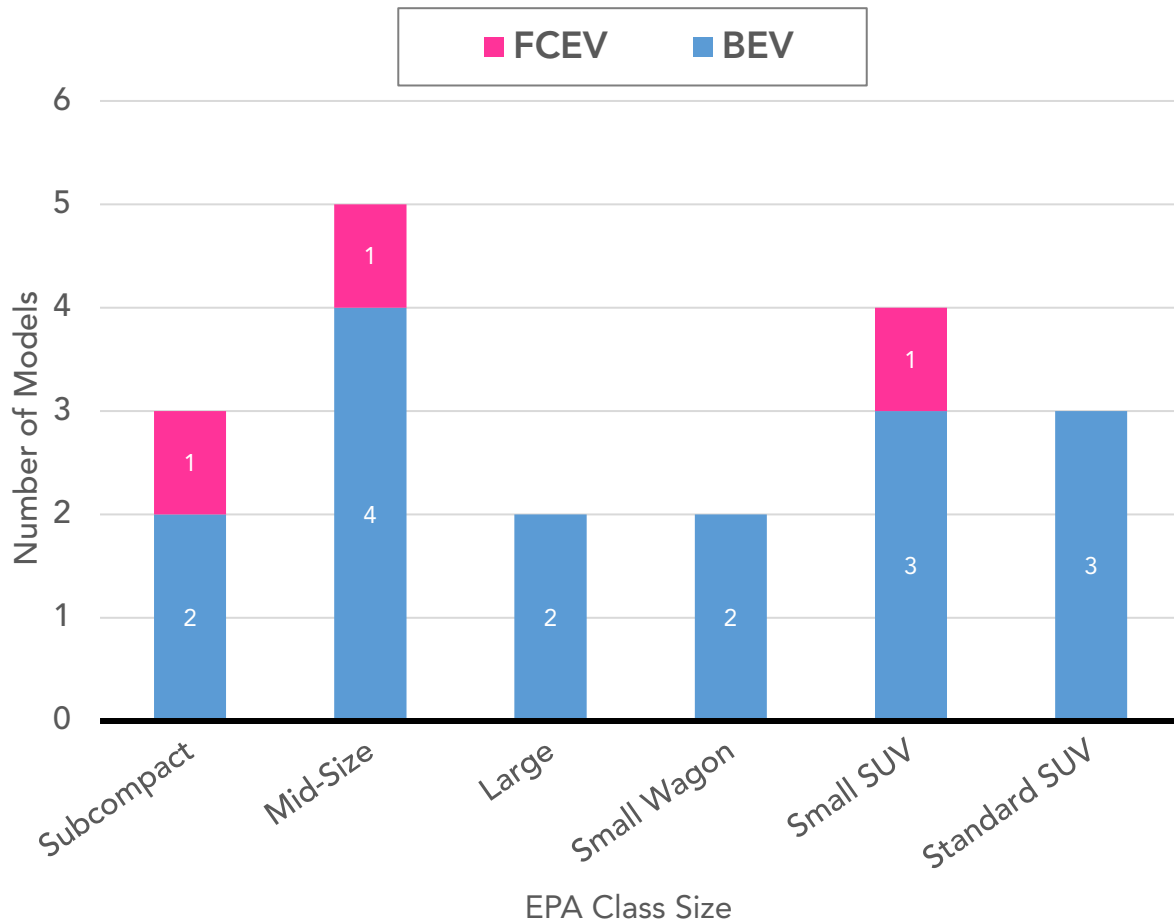


Figure 1. Number of available ZEV models today, by technology and EPA class

For model year (MY) 2021, many ZEV models available for consumers to purchase have a 250-mile or higher electric range.<sup>32</sup> The current ZEV models on the market will become the used vehicles available to TNC drivers by the time the regulation is implemented. Based on the longer-range ZEVs anticipated to enter the market in the next few years, staff assumed the range that ZEVs used for TNC service, both new and used, will have a range of 250 miles on average for the period of beyond 2023.<sup>33</sup>

CARB staff have estimated that a ZEV with a range of 250 miles meets the needs of nearly all of TNC daily services. In the 2018 base year data provided to CARB,

<sup>32</sup> U.S. EPA and U.S. DOE, Fuel Economy Guide Model Year 2021, December 2, 2020 (<https://www.fueleconomy.gov/feg/pdfs/guides/FEG2021.pdf>, accessed December 3, 2020).

<sup>33</sup> OEM announcements: Volkswagen AG (September 2019) and General Motors (March 2020)

95 percent of TNC vehicles traveled less than 250 miles per day, and 90 percent traveled less than 200 miles per day. The full distribution of average miles driven by all TNC vehicles in 2018 is shown in Figure 2. These estimates are corroborated by an independent academic study that found that 90 percent of TNC driving can be done using a 200-mile range ZEV on a single charge.<sup>34</sup> The study assumes wide availability of 250-mile ZEVs in 2025. Other research validates this range as sufficient for typical TNC daily driving needs.<sup>35</sup>

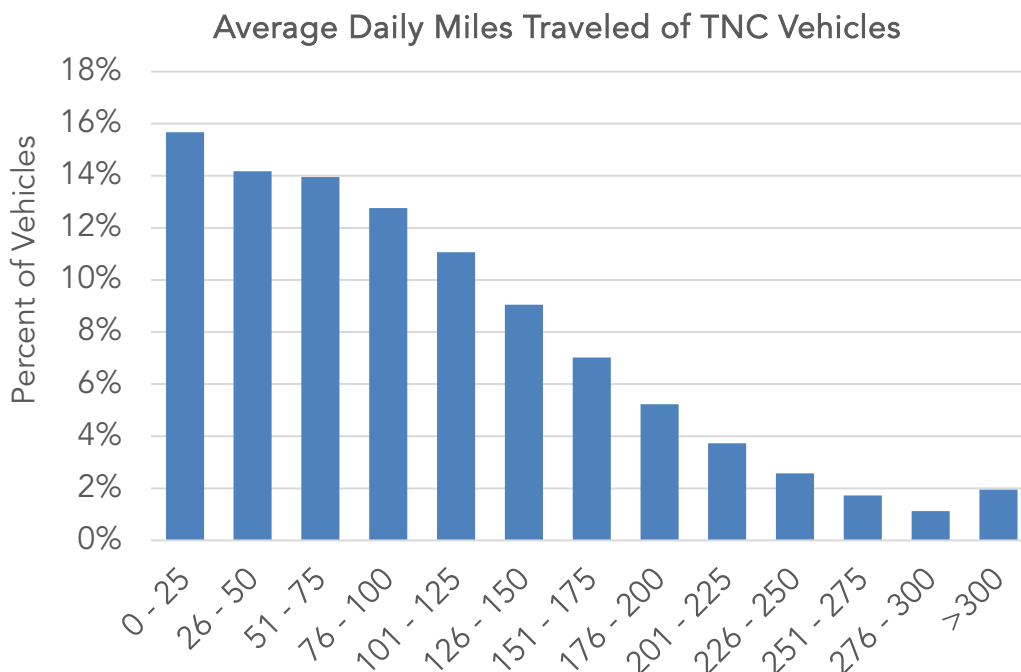


Figure 2. Percent of California TNC vehicles by average daily miles traveled in 2018

For the 5 percent of drivers who need more than 250 miles of charge in one day, they can readily charge throughout the day to gain additional miles of range. Surveyed TNC ZEV drivers charged at a DC fast charger an average of 2.5 times during a shift for drivers with prepaid charging plans.<sup>36</sup> This demonstrates opportunistic charging behavior may be common during a TNC driving shift, although results may be biased

<sup>34</sup> Wenzel, T., Rames, C., Kontou, E., & Henao, A. (2019). Travel and energy implications of ridesourcing service in Austin, Texas. *Transportation Research Part D: Transport and Environment*, 70, 18-34.

<sup>35</sup> Pavlenko, Nikita, Peter Slowik, and Nic Lutsey. "When does electrifying shared mobility make economic sense." *The International Council on Clean Transportation* (2019).

<sup>36</sup> CPUC, *Electrifying the Ride-sourcing Sector in California*.



due to drivers having prepaid charging plans. Drivers may have been charging multiple times a day because the pre-paid plans allowed unlimited charging.

### ***ZEVs are a good fit for ride-hailing***

ZEV technology—referring to BEV or FCEV technology in this program—is a good fit for the ride-hailing platform. ZEVs are uniquely suited for frequent stop-start driving of ride-hail operations, given the lack of engine start and idling emissions, and the technology’s smooth acceleration that enhances the rider experience. Not only does it benefit the environment, but it also benefits drivers and the communities those drivers serve.

Staff project TNC services will grow both in ridership and total VMT (40 percent growth between 2018 and 2030, as discussed in Chapter VI). It is important to consider what the emissions reductions from a typical TNC driver would be. A full-time TNC driver puts an average of 40,000 miles per year on their vehicle on the TNC platform, whereas the typical new California vehicle is driven between 13,000 to 15,000 miles per year for personal use in the first five years, according to vehicle population inventory data captured in EMFAC2017.<sup>37</sup> Transitioning high-mileage drivers to ZEVs will help California achieve its statewide, criteria pollutant and GHG goals, as well as local toxics emission reduction goals.

Not only does zero-emission technology in a TNC fleet provide environmental benefits, drivers could benefit economically by switching to a ZEV. Even with the current higher upfront cost of ZEVs, lower fuel and maintenance costs mean lower costs over the lifetime of the vehicle. In a recent post, Lyft claimed drivers could save between \$50 and \$70 per week on fuel cost alone.<sup>38</sup> With the cost of automotive lithium-ion batteries decreasing, BEVs on passenger car platforms (with an average driving range of 250 miles) are expected to reach cost parity with a gasoline vehicle (without incentives) before 2030.<sup>39</sup> When incentives are accounted for, this upfront cost parity is reached several years earlier.

## **2. Electrification Target Development Using a Cost Model**

As noted earlier, ZEVs are a feasible choice for use in ride-hailing services because models will be available with the adequate range needed for this industry. To inform the development of the annual electrification targets, CARB used a cost optimization

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<sup>37</sup> Pavlenko, *When does electrifying shared mobility make economic sense*.

<sup>38</sup> Lyft, *Leading the Transition to Zero Emissions*.

<sup>39</sup> Appendix C of the SRIA, located in Appendix C of this report.

model. This section describes the structure of the cost model and assumptions (upfront capital costs and ongoing maintenance costs) used to establish annual targets as the output of the model. In simpler terms, to develop the electrification targets, staff input the total costs for the year to the driver and the model has an output of how many vehicles would have zero costs to switch to a ZEV. Accounting for the number of vehicles switched each year, the cost model derives a maximum percent eVMT. The model's resulting annual percent eVMT values are then adjusted by staff to create a smoother trajectory for the proposed regulatory eVMT targets.

### ***Structure of the Cost Model***

This section describes the basic structure of the cost model and the logic in how it selects TNC vehicles to switch to ZEVs. Importantly, the TNC fleet in the cost model for future years includes the same vehicle age distribution of new and used vehicles as found in the 2018 TNC fleet, reflecting that TNC drivers will continue to have varying ability to own newer model-year vehicles. More details about the baseline fleet are provided in Chapter VI. For each given year of the regulation period, the model loops through all of the vehicles in the California TNC fleet and applies the following logic.

- If an individual vehicle being considered for a switch is currently not a ZEV, then test criteria for switching to a ZEV include:
  - Upfront or capital cost assumptions and ongoing operational costs assumptions
  - If a vehicle model year (MY) is newer than 2016 and incremental upfront costs of obtaining a ZEV of the same model year as the currently owned internal combustion engine (ICE) (incremental vehicle purchase price, purchase incentives, annualized Level 2 charging equipment purchase), and operation costs (fuel savings, maintenance savings, insurance costs, ZEV registration fees, plus extra savings to overcome ZEV barriers) combined is less than zero, then switch to ZEV, otherwise do not switch
  - If a vehicle MY is older than 2016<sup>40</sup> and the full weekly cost of ZEV rental, plus extra savings to overcome ZEV barriers, minus fuel savings is less than zero, then switch to ZEV, otherwise do not switch. This is done for older vehicles because staff does not believe there will be enough ZEV models available with adequate range to buy as used vehicles,

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<sup>40</sup> The rental assumption is only applied to drivers with a MY 2016 or older vehicle. This MY was selected given no low-cost electric vehicle with long range available for prior MYs. By 2023, the number of MY 2016 and older vehicles used by TNC drivers is low, and therefore this assumption has a small impact on the results.

particularly in earlier years. Staff assumed that these vehicles would be replaced by a rental.

- If vehicle is already a ZEV, then leave it as a ZEV and associate no costs.

### ***Cost Model Input Values – Upfront or Capital Costs***

Upfront or capital costs include the incremental vehicle cost for purchasing a new or used ZEV while taking into account vehicle incentives, and Level 2 charger costs. Staff recognize that some drivers, particularly with lower income may not have access to funds for incremental cost for a ZEV and may still will have challenges. Some incentive programs are available to lower income drivers (discussed in Chapter VIII). It's possible incentive programs will evolve and will be considered in separate program proceedings.

#### *Incremental Vehicle Costs*

The additional cost of purchasing a ZEV above and beyond the costs of purchasing an equivalent ICE vehicle is the incremental vehicle cost. These cost values were projected for each year of the regulation for passenger cars and light-duty trucks. Projected new vehicle incremental cost values used in the model are ICCT costs adjusted using the latest industry information by CARB staff.<sup>41</sup> The ICCT BEV battery costs were revised upward by roughly 7 percent in 2017 to \$200/kWh, 25 percent in 2025 to \$125/kWh, and 40 percent in 2030 to \$100/kWh to represent a less aggressive (and thus more conservative) battery cost reduction trajectory. Note that FCEVs can be used by TNC drivers as a ZEV, but FCEV costs were not modeled in the eVMT cost model. BEV costs are projected to remain lower than those of FCEVs through 2030, and there was a larger amount of information available on BEV costs for this analysis.

In order to estimate the incremental cost of used BEVs, a depreciation scale was applied that specifies the relative value of the used vehicle based on the vehicle age, ranging from 0 to 15 years of age. For vehicle ages 0 to 5 years, the Edmunds depreciation values were used.<sup>42</sup> For vehicle ages 6 to 15, a simple 15 percent loss in value was applied to each year continuing the trend from 0 to 5 years. The analysis assumes that for the years of the proposed regulation, depreciation rates for ZEVs will be similar to those of conventional vehicles.

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<sup>41</sup> Lutsey, N., & Nicholas, M. (2019). Update on electric vehicle costs in the United States through 2030. *Int. Counc. Clean Transp*, 1-12.

<sup>42</sup> <https://www.edmunds.com/car-buying/how-fast-does-my-new-car-lose-value-infographic.html>, accessed December 5, 2019.

The incremental used ZEV purchase costs were estimated by depreciating the new vehicle costs, after having subtracted any vehicle purchase incentives. Thus, this method passes a portion of savings from incentives that a new vehicle purchaser benefits from, on to the used vehicle purchaser.

### *Vehicle Incentives*

There are two California vehicle incentives used in the eVMT cost model: a Low Carbon Fuel Standard (LCFS) rebate for new BEV owners, the Clean Vehicle Rebate Project (CVRP)<sup>43</sup> rebate for purchases of new ZEVs.<sup>44</sup> For used ZEVs, there are additional regional programs that were not evaluated for this regulation because they may not always apply to 2-3 year old vehicles, which are a majority of vehicles in the TNC fleet, and have an income component. If the drivers are eligible for these regional programs, they would incur lower costs. The federal tax benefit for BEVs was not applied to the cost model given several prominent automakers no longer qualify, with potentially more automakers hitting the federal cap between 2023 and 2030.<sup>45</sup> Staff is aware of proposals to modify the federal tax benefit so that more automakers qualify; if the federal tax benefit was increased in scope or amount in the future, this could make it easier for TNC drivers to switch to ZEVs than what is anticipated by this analysis.

For all years of the regulation, a \$1,000 Clean Fuel Reward point-of-purchase LCFS rebate was applied to each new vehicle. This value is estimated using a weighted average of previous LCFS rebate amounts offered by the three largest investor owned utilities in California.<sup>46,47,48</sup> The standard CVRP rebate amount for a typical ZEV in 2020 is \$2,000 for participants who don't qualify for an increased rebate based on income.<sup>49</sup> For future years in the cost model, the CVRP amount was slowly reduced in increments of \$500 over time so that it becomes zero at the same time at which the incremental vehicle costs also becomes zero in 2029<sup>50</sup> as shown in Table 1. Research shows that an

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<sup>43</sup> <https://cleanvehiclerebate.org/eng/eligible-vehicles>, accessed June 5, 2020.

<sup>44</sup> <https://ww3.arb.ca.gov/regact/2019/lcfs2019/fro.pdf>.

<sup>45</sup> <https://www.irs.gov/newsroom/plug-in-electric-vehicle-manufacturer-crosses-200000-sold-threshold-tax-credit-for-eligible-consumers-begins-phase-down-on-april-1>, accessed June 19, 2020.

<sup>46</sup> <https://cleanvehiclerebate.org/eng/eligible-vehicles>, accessed June 5, 2020.

<sup>47</sup> <https://www.sce.com/residential/electric-vehicles/ev-rebates-incentives/cfrp>, accessed December 10, 2019.

<sup>48</sup> <https://www.sdge.com/residential/electric-vehicles/electric-vehicle-climate-credit>, accessed December 10, 2019.

<sup>49</sup> <https://cleanvehiclerebate.org/eng/eligible-vehicles>, accessed June 5, 2020.

<sup>50</sup> For the passenger car classification at 250 miles of driving range.

incentive amount below \$1,000 is not meaningful for consumers so program staff do not plan to use this approach for CVRP. This cost model is used solely for the purposes of evaluating the Clean Mile Standard.

Table 1. CVRP and clean fuel reward program rebate assumptions for model

Year	2020-2021	2022-2023	2024-2026	2027-2028	2029+
<b>CVRP rebate</b>	\$2,000	\$1,500	\$1,000	\$500	\$0
<b>Clean Fuel Reward Program</b>			\$1,000		

### ***Level 2 charger costs***

Another upfront cost input in the cost model is the cost of a level 2 home charger. This analysis assumes that each TNC ZEV driver would purchase a Level 2 home charger and incur an annualized cost of a home charger, regardless of the amount of DC fast charging assumed. This assumption was chosen for two reasons. First, assuming each TNC ZEV operator would purchase a Level 2 home charger provides a conservative upper bound for the costs of the proposed regulation. Second, the data submitted to CARB by TNCs did not have sufficient information to reasonably predict which drivers or vehicles would have access to home charging, such as whether a driver rents or owns a home or information regarding a driver’s housing type. Home charger costs vary over the regulation period from \$1,408 in 2023 to \$1,184 in 2030 and include average installation costs.<sup>51</sup> Table 2 shows annualized cost per year, where the home charger cost is amortized over a 7-year period with a 5 percent interest rate.

Some drivers may be able to take advantage of lower installation costs. Depending on driving patterns, some drivers may be able to use an existing 240-volt Level 1 plug as well as occasional DC fast charging and thereby avoid charger installation costs. In addition, newer California homes may have pre-wiring for Level 2 charging that could lower the average installation costs.<sup>52</sup> To remain conservative, staff’s analysis did not consider these potential cost savings.

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<sup>51</sup> For a complete description of how Level 2 Home Charger installation costs were determined, see the SRIA Technical Appendix, Level 2 Home Charging Station Cost Section.

<sup>52</sup> See, e.g., CalGreen, Tier 1 Residential Measures (Effective Jan 1, 2017), <https://www.hcd.ca.gov/building-standards/calgreen/docs/hcdsh1605b.pdf>.

Table 2. Annualized home charger cost per year

Year	2023	2024	2025	2026	2027	2028	2029	2030
Annualized home charger cost	\$243	\$234	\$232	\$227	\$221	\$216	\$210	\$205

**Cost Model Input Values – Ongoing or Operational Costs**

This section outlines the ongoing or operational costs a driver will incur in a year. This is an input for the model when combined with the upfront or capital costs to arrive at the total cost for a driver. Operational costs include the price of fuel (gasoline and electricity), a ZEV barrier cost, insurance, maintenance and registration.

*Gasoline Prices*

Gasoline prices for conventionally fueled vehicles for the years 2023 to 2030 rely on the CEC’s Demand Analysis Working Group Energy Demand Forecast Update.<sup>53</sup> Gasoline costs are based on the gasoline used by an individual driver’s conventional vehicle, which is estimated as that driver’s annual VMT divided by the respective vehicle’s actual U.S. EPA rated fuel efficiency, multiplied by the calendar year projected gasoline prices. The gasoline prices assumed per year are shown in Table 3.

Table 3. Gasoline prices assumed in model

Year	2023	2024	2025	2026	2027	2028	2029	2030
Gasoline Price (\$/gal)	2.66	2.62	2.63	2.63	2.63	2.62	2.62	2.65

The costs of gasoline and electricity displayed above includes all state, local, and federal taxes and fees. Assumed state and local taxes on gasoline and electricity are listed in Table 4.

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<sup>53</sup> California Energy Commission. Link to presentations from the November 19 Demand Analysis Working Group meeting on the California Energy Demand Forecast results (<https://www.energy.ca.gov/programs-and-topics/topics/energy-assessment/demand-analysis-working-group-dawg/meetings-and>).

Table 4. State and local taxes on gasoline and electricity

Fuel Type	Local Tax	State Tax
Gasoline	4.7% sales tax	\$0.505/gal excise tax
Electricity	3.53% utility users tax*	\$0.0003/kWh

\*Statewide population-weighted average

### Home Charging Electricity Rate

Home charging electricity prices assumed in this analysis are reflective of a combination of existing and forecasted residential electricity rates in California and of electric vehicle specific time-of-use (TOU) rates using the three largest investor-owned electric utilities in California as a surrogate. The overall statewide home charging rates for electricity applied in the model are shown in Table 5 as a weighted average of the largest utility company rates and the population that they each serve as well as the season of the year.<sup>54</sup>

Table 5. State EV home charging rate assumptions

	Calendar Year							
	2023	2024	2025	2026	2027	2028	2029	2030
<b>Statewide Home Charging Rate (\$/kWh)</b>	0.16	0.15	0.15	0.15	0.14	0.14	0.13	0.13

Overall, home charging rates are assumed to be applied consistently across the state, with a slight decrease in prices over the regulation calendar years from \$0.16 per kWh in 2023 to \$0.13 per kWh in 2030. Residential electricity prices from home charging used in total cost of ownership modeling by the ICCT researchers also indicates that \$0.13-\$0.14 per kWh is reasonable through the 2030 time period given TOU pricing.<sup>55</sup> Home charging electricity prices used in the model align with current research, while accounting for lower enrollment in EV-specific rates and less optimal price-based decisions in earlier years of the regulation. For this analysis, half of the drivers charge at home and that remains constant through the years.

<sup>54</sup> See Home Charging Electricity Rate Section of the SRIA for details.

<sup>55</sup> Pavlenko, *When does electrifying shared mobility make economic sense.*

### *Direct Current Fast Charging Refueling Price*

Due to higher capital and operating costs, DC fast charging rates are typically more expensive than residential or public Level 2 charging rates. Additionally, electric vehicle service providers (EVSPs) or site hosts operating the DC fast chargers set the prices for charging, and therefore prices of electricity service to the site cannot be used solely for establishing these refueling prices.

DC fast charging prices used in the model are based on recent data of DC fast charging prices as provided by the U.S. Department of Energy's (DOE) Alternative Fuels Data Center (AFDC) and are projected based on research indicating a decrease in these refueling prices.<sup>56</sup> The AFDC database details the total number of DC fast charging stations currently installed in California for public use and includes a data field on charger pricing or the price charged to consumers.<sup>57</sup> Based on data from the end of 2019, staff analysis indicates a statewide average of \$0.41 per kWh for DC fast charging.<sup>58</sup> Similar values are used in total cost of ownership models by the ICCT researchers.<sup>59</sup>

The 2019 DC fast charging price of \$0.41 per kWh is used in the initial year, with subsequent years showing decreased prices to eventually reach \$0.24 per kWh in 2026. CARB staff used a linear interpolation between 2019 and 2026 to align with similar ICCT research indicating that a rate of \$0.24 per kWh may be possible in the 2025 timeframe.<sup>60</sup> Decreased DC fast charging prices in future years are likely due to increases in charger utilization and reduced costs of non-hardware components such as site preparation, grid upgrades, and installation costs. After reaching the \$0.24 per kWh price point in 2026, this rate is assumed to remain the same through 2030. The resultant calendar year DC fast charging prices assumed over the regulation period are shown in Table 6. For this analysis, staff assume 50 percent of drivers charge at home and this ratio is held constant for all years of the analysis.

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<sup>56</sup> U.S. Department of Energy. Alternative Fuels Data Center: Electric Vehicle Charging Stations. ([https://afdc.energy.gov/fuels/electricity\\_stations.html](https://afdc.energy.gov/fuels/electricity_stations.html), accessed June 3, 2020).

<sup>57</sup> U.S. Department of Energy. Alternative Fuels Data Center: Electric Vehicle Charging Station Locations. ([https://afdc.energy.gov/fuels/electricity\\_locations.html#/analyze](https://afdc.energy.gov/fuels/electricity_locations.html#/analyze), accessed June 3, 2020).

<sup>58</sup> U.S. Department of Energy. Alternative Fuels Data Center: Electric Vehicle Charging Station Locations Advanced Filter, Download Results. Accessed December 6, 2019.

<sup>59</sup> Pavlenko, *When does electrifying shared mobility make economic sense?*

<sup>60</sup> Pavlenko, *When does electrifying shared mobility make economic sense?*



Table 6. DC fast-charging price assumptions

Calendar Year	2023	2024	2025	2026	2027	2028	2029	2030
DCFC Rate (\$/kWh)	\$0.31	\$0.29	\$0.26	\$0.24	\$0.24	\$0.24	\$0.24	\$0.24

*Other Barriers to Switching to a ZEV*

Discussions with stakeholders revealed that there are still barriers to ZEV usage in TNC services beyond the purchase price of the vehicle, access to charging, and costs to fuel. These barriers could be related to concerns by TNC drivers that ZEVs may not have sufficient range for their needs or concerns of down time and revenue loss while refueling the ZEV. CARB staff included a “ZEV barrier cost” as a proxy for these concerns in the model and assumed that ZEV barrier cost starts at \$50 per week in 2020 and reduce linearly to \$0 per week by 2030 as shown in Table 7. ZEV barrier values used are from stakeholder input.<sup>61</sup> Staff assumes the barrier amount will decline as electric vehicle technology and fueling infrastructure matures. The projected annual barrier costs for a TNC vehicle switching to a ZEV are determined by taking the number of weeks a vehicle is active in TNC service, which varies across the TNC drivers, multiplied by the weekly ZEV barrier cost.

Table 7. ZEV barrier costs (\$/week)

Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Barrier	\$50	\$45	\$40	\$35	\$30	\$25	\$20	\$15	\$10	\$5	\$0

*Incremental Cost of Insurance*

The main factor that influences vehicle insurance costs, after a baseline for liability, is the value of the vehicle insured. Thus, incremental insurance costs for a BEV compared to that of an ICE vehicle were estimated as 5 percent of the incremental capital costs as done in a 2018 UC Davis study.<sup>62</sup> After the point at which BEV capital costs are less expensive than ICE vehicles, insurance for BEVs is assumed to be lower representing a cost savings.

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<sup>61</sup> Lyft 2020, written comment letter to CARB

<sup>62</sup> Fulton 2018, *Ownership Cost Comparison of Battery Electric and Non-Plug-in Hybrid Vehicles*.

### *Incremental Cost of Maintenance*

The incremental cost of maintenance for a BEV from a conventional gasoline vehicle is assumed to be a negative value (a savings). An ICCT study estimates the maintenance costs for gasoline and BEVs.<sup>63</sup> The savings are approximately \$0.035/mi or 3.5 cents per mile for a BEV driver, which was used as an input in the cost optimization model for BEV and FCEV for all years of the regulation.

### *California ZEV Registration Fee*

In California, as established by SB 1 (2017), each ZEV owner must pay an additional \$100 per year in vehicle registration fees (except in the first year the vehicle was purchased) to replace the lost revenue from not contributing to gasoline taxes.<sup>64, 65</sup> Thus, each TNC driver who switched to a ZEV also is assumed to pay an additional \$100 per year.

## **3. Annual Electrification Targets**

Based on this the inputs described, the cost model output is the number of vehicles that could switch to a ZEV with no additional costs. Taking into account this analysis, CARB staff are proposing annual electrification targets for the TNC companies in the metric of percent eVMT, consistent with statutory requirements. These targets apply starting in 2023 and increase in stringency through 2030. As described in the earlier section, the feasibility of these targets was based on a cost assessment. The analysis generally revealed that as BEV costs decline in the next few years, it will become increasingly possible for a wider range of drivers to access and use electric vehicles in TNC services.

The proposed percent eVMT targets are shown in Table 8. Miles from BEVs and FCEVs are both equally qualified to meet the targets. This report refers to BEVs and FCEVs collectively as ZEVs.

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<sup>63</sup> Pavlenko, *When Does electrifying shared mobility make economic sense?*

<sup>64</sup>[https://leginfo.legislature.ca.gov/faces/codes\\_displaySection.xhtml?lawCode=VEH&sectionNum=9250.6](https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=VEH&sectionNum=9250.6), accessed June 5, 2020.

<sup>65</sup> Senate Bill 1.

Table 8. Proposed annual percent eVMT targets

Calendar Year	Percent eVMT Target
2023	2%
2024	4%
2025	13%
2026	30%
2027	50%
2028	65%
2029	80%
2030+	90%

Staff analysis concluded that compliance with the 90 percent eVMT target in 2030 would require just 43% of TNC vehicles to be switched to ZEVs by 2030. By contrast, in the first compliance year of 2023, less than 0.1% of TNC vehicles are expected to be switched to ZEVs.

Miles from plug-in hybrid electric vehicles (PHEVs) or conventional vehicles with high-voltage battery systems will not count toward the eVMT targets as they use internal combustion engine technology and contribute to tailpipe emissions. To consider electric miles driven by PHEVs would require recorded vehicle data of miles driven without the combustion engine. This type of data collection, which requires vehicle interface tools to access data stored on board the vehicle, would not be feasible for the vast majority of TNC drivers. Sufficient data would require wide-scale data access by drivers through automotive repair or other such facilities that have interface tools; therefore, PHEVs miles may not be used towards the electrification target. However, they help TNCs meet the GHG target because their CO<sub>2</sub> emission rate is much lower compared to other technologies.

The compliance metric of percent eVMT for a TNC is defined as the Period 3 eVMT by BEVs and FCEVs divided by the total Period 3 VMT for the company in a given year. This compliance definition of using only Period 3 eVMT will best preserve the intent of the regulation and minimize unintended consequences. Hypothetically, computer algorithms that govern TNC operations could maximize Period 1 and 2 (deadheading) miles for ZEV drivers and prioritize ride matches for ICE vehicle drivers, making electrification targets easier to achieve. Using only Period 3 miles for eVMT compliance minimizes the potential for unintended consequences, such as increased total VMT. Given that this metric is relative to a company’s own VMT, the percent eVMT is not impacted by changes in a TNC’s market share or growth in the state.

## B. Greenhouse Gas Targets

SB 1014 also directs CARB to set annual GHG reduction targets. These targets go beyond electrification and encourage the ride-hailing companies to innovate in reducing VMT through strategies such as decreasing miles driven without a passenger, decreasing single-occupancy trips, and encouraging active transport and connections to transit.

### 1. GHG Target Development

TNCs have a menu of options for reducing their company-wide GHG emissions to comply with the annual targets, which include:

- *Improving fleetwide GHG performance.* For example, TNCs could motivate drivers to use lower GHG-emitting vehicles, such as hybrid electric vehicles (HEVs). Alternatively, TNCs could motivate drivers to use ZEVs to avoid emitting GHG emissions altogether.
- *Reducing VMT by increasing shared rides.* For example, this could be achieved through increased matching of trips traveling along a similar route. If a TNC driver picks up two different parties from nearby locations and transports them to a local airport together, the TNC would conceivably be credited with 2.5 passenger miles for each mile traveled.
- *Reducing VMT by reducing deadhead miles (Period 1 and Period 2 miles) relative to Period 3 miles.* Period 1 miles and Period 2 miles are considered “empty miles” as there is no passenger in the vehicle. There are a number of ways a TNC could reduce deadhead miles, such as designated waiting areas for TNC vehicles to park temporarily for free. While these places may be limited in urban areas, having designated waiting areas could benefit communities by reducing congestion, could benefit drivers by reducing overall fuel consumption, and benefits TNCs by reducing GHG emissions per passenger mile. TNCs could also manage supply and demand better by not oversaturating drivers in a given area. The TNC business model is predicated on shorter wait times for riders. Having more drivers circling around means shorter wait times, but increased deadhead miles.
- *CO<sub>2</sub> credits.* TNCs can earn CO<sub>2</sub> credits by investing in active transportation infrastructure, providing integrated fare options to connect riders to mass transit, and subsidizing drivers to reduce cost of ZEV ownership, rental or charging.

The GHG reduction targets are intended to allow TNCs to use all of these strategies beyond the minimum electrification compliance shown in Table 8 earlier. However,

due to limited data on pooling demand, deadhead mile reduction potential, and anticipated use of proposed regulatory credits, the gap between the electrification and GHG targets allows flexibility in the combination of strategies used. The GHG targets are set approximately 10 percent above the GHG levels that would occur from meeting the minimum electrification requirement by 2030. The GHG targets year by year is a gradual curve that follows the electrification target curve. This concept was presented at a public workshop in November 2020. Furthermore, these targets are consistent with the electrification commitments made by both Lyft and Uber.

## 2. Annual GHG Targets

CARB staff is proposing the annual GHG targets shown in

Table 9. The GHG targets are in the metric of grams of carbon dioxide- equivalent tailpipe emissions per passenger mile traveled (g CO<sub>2</sub>/PMT). Emissions related to fuel production and distribution were not considered when setting the targets because only tailpipe CO<sub>2</sub> is specified in SB 1014 and there is significant complexity in projecting varying fuel carbon intensity for varying future compliance years. However, fuel production and distribution emissions are included in calculating the emissions benefits from the program.

Table 9. Proposed annual GHG targets

Calendar Year	g CO <sub>2</sub> /PMT Target
2023	252
2024	237
2025	207
2026	161
2027	110
2028	69
2029	30
2030	0

Equation 1 shows the calculation of g CO<sub>2</sub>/PMT. This equation will be used to calculate a TNC’s compliance with the annual GHG targets defined in Table 9. As noted earlier, Equation 1 shows TNCs have multiple strategies they could utilize to meet annual GHG targets.

Equation 1.

$$\frac{g\ CO_2}{PMT} = \frac{\sum(VMT_{P1,P2,P3} \times CO_2\ factor)_{Trip}}{\sum(VMT_{P3} \times compliance\ occupancy)_{Trip}}$$

where:

VMT<sub>P1,P2,P3</sub> = VMT from Periods 1, 2, and 3

CO<sub>2</sub> factor = rate of CO<sub>2</sub> emissions for the vehicle, provided in a look-up table in the unit of g CO<sub>2</sub>/mile

VMT<sub>P3</sub> = VMT from Period 3 only

Compliance occupancy = Occupancy value for each trip provided as a look-up table

Compliance with the GHG targets for each TNC over a given year is determined by summing emissions of all of the trips for each vehicle that provided service for the TNC in that year. Only miles traveled while a TNC driver is logged onto the ride-hailing app count toward the total trips used for compliance (TNC service or platform miles).

As an exercise, staff considered the significance of varying levels of non-compliance. Non-compliance by an amount above 4 percent of the electrification or GHG targets may be considered a severe infraction. Non-compliance by 4 percent of the GHG target in 2023 represents more than half the difference (15 g CO<sub>2</sub>/PMT) in targets between 2023 and 2024. The proportion of the GHG target difference between later compliance years becomes larger. Therefore, it becomes increasingly important to minimize emission impacts in the later part of the program. Any penalties at this level of non-compliance (above 4 percent) could be more lenient in the early years as the TNCs are still experimenting with compliance strategies in the market.

Non-compliance by 2 percent of either the electrification or GHG targets may be considered a minor infraction. Staff suggest that non-compliance between 2 percent and 4 percent of the GHG targets be considered a moderate infraction. Ultimately, however, non-compliance tiers and penalties will be determined by the CPUC, as they are the implementing agency.

### 3. GHG Credits to Promote Mode Shift

SB 1014 states that miles completed by zero-emission means should include walking, biking, other modes of active transportation, and ZEVs.<sup>66</sup> As such, several design principles used in developing the proposed regulation centered on sustainable transportation.<sup>67</sup> Specifically, the regulation strives to encourage active transportation and transit usage, which enables the reduction of VMT while supporting passenger miles traveled. Generally, policies that support connections to public transit can promote access to transportation opportunities.

To address the legislation and to promote these design principles, CARB is proposing voluntary regulation credits that can be used for compliance with the GHG targets. To claim these credits, additional data submittals are required as described in Chapter IV. These credits must be used in the same year to meet their obligation and cannot be carried forward to the next year. Because these credits may only be used to meet the GHG targets and not the eVMT targets, there is a natural limit in their usage and therefore staff did not feel compelled to limit these credits.

#### **Background**

Partnerships between new mobility providers, like TNCs, and public agencies, such as transit agencies are being tested across California and the nation.<sup>68,69</sup> These case studies provide insights into how the regulation credits have been designed to promote active transportation and transit connections.

Staff conducted about three dozen interviews related to partnerships between transit agencies and TNCs, or other new mobility programs. Staff interviewed local transit agencies, metropolitan planning organizations (MPOs), local jurisdictions, airports, and private sector partners. Topics focused on first and last mile connections to transit, supplementing or substituting fixed transit routes, integrated fare payment systems, and incorporating active transportation. From the interviews, staff identified the following challenges and opportunities.

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<sup>66</sup> Senate Bill 1014, Section 5450 b(3).

<sup>67</sup> CARB Resolution 20-4, Informational Update on the Clean Mile Standard Establishing 2018 Base-Year Emissions. January 2020 (<https://ww3.arb.ca.gov/board/res/2020/res20-4.pdf>).

<sup>68</sup> Chaddick Institute, 2018, *Partners in Transit: A Review of Partnerships between Transportation Network Companies and Public Agencies in the United States*.

<sup>69</sup> National Academies of Sciences, Engineering, and Medicine, 2019, *Partnerships Between Transit Agencies and Transportation Network Companies*.

- While first-last mile TNC partnerships with transit were popular, transit agencies often struggled with verifying if TNC riders actually connected to transit. There is an opportunity to verify transit connections through integrated fare systems that show proof of payment on transit at time of booking ride-hailing trip.
- Public agencies want to provide more efficient service and TNCs can help provide transportation options to locations where traditional transit service is more challenging (e.g., rural and suburban areas). There is an opportunity for CMS to continue to advance innovation through partnerships with transit agencies, which promotes greater access to transportation options.
- Agencies identified the need to provide more mobility options to the public and include the integration of more ZEVs in the fleet to help reduce emissions.
- Agencies often mentioned that there was a lack of data from the TNCs, so there is a need to include strong data reporting requirements as part of CMS to ensure that compliance with the regulation, including credits, can be verified.
- For bike and scooter partnerships, a challenge was safety and a lack of bikeway infrastructure to support users. More investments in bikeway infrastructure such as protected bike lanes could help address these concerns. CMS could promote these types of investments to support TNC and active transportation connections.
- Numerous equity concerns were identified including: limited knowledge of how to use various transportation services, lack of access to smart phones, limited access to credit, meeting Americans with Disabilities Act (ADA) standards for accessibility, the elimination of transit routes, and the placement of shared bikes and scooters, which often perpetuate disparities. Agencies tried to address these concerns through integrating equity in education campaigns, subsidized fares, ADA alternative services, and percentages of bikes/scooters placed in low-income/disadvantaged communities. Increased attention should be given to promoting equitable transportation programs in future partnerships between mobility providers.

Using these lessons learned, staff propose the following voluntary credit options that may be used to comply with the GHG targets. The section describes the three credit options in general. Details of the calculations and data reporting are outlined in Chapter IV.



### ***Credit Option 1: Investments in Bikeway and Sidewalk Infrastructure***

This credit is for TNC investments in bikeway and sidewalk<sup>70</sup> infrastructure to promote active transportation. The goal of this credit is to provide safe mobility options through infrastructure investments. Research on the impact of bikeway and sidewalk infrastructure projects show that infrastructure investments have the potential to significantly increase active transportation and decrease driving.<sup>71,72,73,74</sup>

### ***Credit Option 2: Credit for Integrated Fare Transit Trips***

This credit is for TNC trips connected to transit via an integrated fare payment system with a transit agency, to support the use of alternative modes of transportation and bolster the development of integrated fare payment. An example of an integrated payment system is the California Integrated Travel Program (CAL-ITP). Cal-ITP is an initiative led by the California State Transportation Agency (CalSTA), Caltrans, and transit partners. Cal-ITP will create opportunities for integration specifically by improving efficiencies that lower costs and barriers to trip planning and payment for local, regional and inter-regional journeys, and beyond. The program will also enhance the customer experience through accurate and convenient trip planning and payment. Cal-ITP received \$28 million in Transit and Intercity Rail Capital Program (TIRCP) funding, and in July of 2020, announced its first partnership demonstration with Monterey-Salinas Transit (MST) to implement contactless fare payment technology in public transit buses to allow riders to use a contactless-enabled mobile device to pay their fare on any MST bus line. There are hundreds of transit agencies in California, with no uniform way to plan and pay for a trip. Creating an easy-to-use, standardized payment method across different transit agencies is an important element of CAL-

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<sup>70</sup> Sidewalk is a dedicated pedestrian path along a roadway, separated from motor vehicles by a curb. It does not include other infrastructure such as pedestrian overpass, bus bay or street furniture.

<sup>71</sup> Handy, Susan, Gil Tal, and M. D. Boarnet. "Impacts of bicycling strategies on passenger vehicle use and greenhouse gas emissions." Policy Brief, California (2014).

<sup>72</sup> Dill, Jennifer, and Theresa Carr. "Bicycle commuting and facilities in major US cities: if you build them, commuters will use them." Transportation research record 1828, no. 1 (2003): 116-123.

<sup>73</sup> Zahabi, Seyed Amir H., Annie Chang, Luis F. Miranda-Moreno, and Zachary Patterson. "Exploring the link between the neighborhood typologies, bicycle infrastructure and commuting cycling over time and the potential impact on commuter GHG emissions." Transportation research part D: transport and environment 47 (2016): 89-103.

<sup>74</sup> Rowangould, Gregory M., and Mohammad Tayarani. "Effect of bicycle facilities on travel mode choice decisions." Journal of Urban Planning and Development 142, no. 4 (2016): 04016019.

ITP's goal of increasing transit ridership, reducing greenhouse gas emissions, and supporting equity.

Under this provision, the TNC would get credit for the portion of the trip that is verified to be connected to transit and paid for through an integrated fare application. Integrated fares have many benefits including increased ease of travel within a region.<sup>75</sup> Integrated fares work by the use of electronic fare medium that effectively allows each agency or mobility provider to retain its own fare structure while agreeing to accept a common fare medium. A rider can thus pay for rides on multiple systems with value from a common "electronic-purse."

#### **IV. The Specific Purpose and Rationale of Each Adoption, Amendment, or Repeal**

The proposed requirements for TNCs, including the annual electrification and GHG targets, will be codified in Title 13, California Code of Regulations, section 2490. The proposed CMS regulation order can be found in Appendix A of this report.

##### **A. Applicability and Definitions of the Proposed Regulation**

###### **Section 2490(a). Applicability and Exemptions**

The proposed regulation applies to TNCs operating in California, but the electrification and GHG targets are not applicable to TNCs with annual operating VMT of less than or equal to 5 million miles. The applicability of this regulation is consistent with the scope of SB 1014.

###### **Section 2490(a)(1). Regulated parties**

###### **Purpose**

The purpose of this subsection is to identify TNCs that operate in California as regulated parties for the specified sections. Beyond the kind of TNCs currently operating in the state with drivers, regulated parties include automated vehicle (AV) operators if they provide TNC services.

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<sup>75</sup> SPUR, Seamless Transit, April 2015 (<https://www.spur.org/publications/spur-report/2015-03-31/seamless-transit>).

## **Rationale**

This subsection is necessary to establish that TNCs operating in California with permits from the CPUC are the regulated parties. Per SB 1014, this regulation is intended to reduce GHG emissions from the TNC sector in California only.

## **Section 2490(a)(2). Exempted entities**

### **Purpose**

The purpose of this subsection is to exempt TNCs with annual operating VMT of less than or equal to 5 million miles from certain requirements as outlined in sections 2490.1, 2490.2, 2490.3(b), and 2490.3(c).

### **Rationale**

This subsection is necessary to establish which parties are not the regulated parties. This regulation is intended to reduce emissions from TNCs operating in California and does not apply to TNCs that operate on a relatively small scale.

Currently, there are approximately a dozen TNCs that are permitted by the CPUC to operate in California. In the 2018 dataset, the two largest TNCs had a combined VMT of approximately 4.2 billion miles which was considerably larger than the combined VMT of the remaining TNCs of approximately 5.9 million miles. This amounts to 0.14 percent of the larger TNCs' combined VMT. The highest VMT of a small TNC was 2.9 million miles. The average VMT of the small TNCs was 600,000 miles. CARB staff chose 5 million VMT as a reasonable threshold above the largest of the small TNCs' VMT to be exempt from certain requirements of the proposed regulation. This threshold allows for growth of the small TNCs before they must plan for the cost of compliance.

TNCs whose operations result in 5 million annual VMT or less will be exempt from meeting electrification and GHG targets. Small TNCs are also exempt from the requirement to submit two-year (biennial) plans on even-numbered years and exempt from annual compliance summary reports. Small TNCs are not exempt, however, from continued data submittal as part of the TNC permit requirement. If a small TNC grows to exceed 5 million VMT in a given calendar year, they will be subject to the requirements beginning the following calendar year.

For example, if a small TNC exceeds 5 million VMT in the year 2025, they are required to meet electrification and GHG targets for the year 2026. The first Annual Compliance Report of this TNC would be due on March 31, 2027, summarizing the company's electrification and GHG compliance values for the 2026 calendar year. All elements of the Annual Compliance Report as listed in

section 2490.3(c) should be included. This TNC must then submit their first Biennial Compliance Plan by January 1, 2028, and every two years thereafter. All elements of the Biennial Compliance Plan as listed in section 2490.3(b) should be included.

### **Section 2490(b). Definitions**

#### **Purpose**

The purpose of this subsection is to set forth definitions for terms used in the proposed regulation order and identifies the sections for which the definitions apply.

#### **Rationale**

This subsection is necessary to provide clarity as to what is required and how the regulation's requirements must be met.

### **Section 2490(b)(1). "Autonomous Vehicle"**

#### **Purpose**

The purpose of this subsection is to define autonomous vehicle as having the meaning provided in section 38750 of the California Vehicle Code.

#### **Rationale**

This subsection is necessary for providing consistency in the definition of autonomous vehicles.

### **Section 2490(b)(2). "Battery Electric Vehicle"**

#### **Purpose**

The purpose of this subsection is to define battery electric vehicle consistent with the Zero-emission Vehicle Regulation.

#### **Rationale**

This subsection is necessary to provide a definition of battery electric vehicles that is the same as the Zero-Emission Vehicle Regulation to maintain consistency in definitions between regulations. Providing consistency is important to help ensure that the public has a clear understanding of the regulation.

### **Section 2490(b)(3). "Charter-party Carrier"**

#### **Purpose**

The purpose of this subsection is to define charter-party carrier as having the meaning provided in Public Utilities Code section 5360.

#### **Rationale**

This subsection is needed in order to distinguish charter-party carriers from TNCs. Per SB 1014, the proposed regulation is not applicable to charter-party carriers that operate only with transportation charter party carrier (TCP) permits, and without TNC permits.

### **Section 2490(b)(4). "eVMT"**

#### **Purpose**

The purpose of this subsection is to define electric vehicle miles traveled as miles traveled in a battery electric vehicle or a fuel cell electric vehicle.

#### **Rationale**

This subsection is necessary to define what types of vehicles count for the eVMT target as zero-emission miles. Only miles accrued by BEVs and FCEVs may count toward eVMT. Miles from PHEVs will not be counted toward eVMT, due to the inability of the TNC app to track the amount of all-electric miles driven by PHEV drivers. However, PHEVs' lower GHG emissions contributes toward a TNC's GHG reduction.

### **Section 2490(b)(5). "Fuel Cell Electric Vehicle"**

#### **Purpose**

The purpose of this subsection is to define fuel cell electric vehicle consistent with the definition of hydrogen fuel cell vehicle in the Zero-Emission Vehicle regulation.

#### **Rationale**

This subsection is necessary to define fuel cell electric vehicles consistent with the Zero-Emission Vehicle regulation to provide consistency.

### **Section 2490(b)(6). "Hybrid Electric Vehicle" or "HEV"**

#### **Purpose**

The purpose of this subsection is to designate hybrid electric vehicles as one of the means to achieve lower fleet-wide GHG emissions.

### **Rationale**

This subsection is necessary to define hybrid electric vehicles consistent with the Advanced Clean Car regulations.

### **Section 2490(b)(7). "Integrated Fare Payment"**

#### **Purpose**

The purpose of this subsection is to define a method of payment for a TNC-connected transit trip. An integrated payment in this section means a payment that allows a person to make a trip that involves transfers between a TNC and transit agency. The payment would be connected in a TNC app and would provide payment and payment information to the transit agency. An example would be Cal-ITP.

#### **Rationale**

This subsection is necessary to specify that a qualifying payment transaction type for a TNC-connected transit trip is through an integrated payment system.

### **Section 2490(b)(8). "Passenger Miles Traveled" or "PMT"**

#### **Purpose**

The purpose of this subsection is to define passenger mile traveled as the distance traveled by passengers.

#### **Rationale**

This subsection is necessary for distinguishing passenger miles from vehicle miles.

### **Section 2490(b)(9). "Personal vehicle"**

#### **Purpose**

The purpose of this subsection is to define personal vehicle as having the meaning provided in section 5431(b) of the Public Utilities Code.

#### **Rationale**

This subsection is necessary for ensuring consistency in the definition of personal vehicle with the Public Utilities Code. Since this regulation is applicable to TNC services where personal vehicles are used, it is important to provide clarity and consistency in the definition of personal vehicle.

## **Section 2490(b)(10). "Plug-in Hybrid Electric Vehicle"**

### **Purpose**

The purpose of this subsection is to provide a definition of plug-in hybrid electric vehicles consistent with the Zero-emission Vehicle regulation.

### **Rationale**

This subsection is needed to define PHEVs clearly for consistency between regulations. Providing consistency is important to help ensure that the public has a clear understanding of the regulation.

## **Section 2490(b)(11). "Pool-matched Trip"**

### **Purpose**

The purpose of this subsection is to define a pool-matched trip as a TNC ride where multiple parties that requested pooled service were matched.

### **Rationale**

This subsection is necessary to distinguish pool-matched trips from pool-requested trips. Pooling status determines the occupancy value used in calculating GHG per passenger mile compliance.

## **Section 2490(b)(12). "Pool-requested Trip"**

### **Purpose**

The purpose of this subsection is to define a pool-requested trip as a TNC ride where the passenger, or passengers, have requested pooled service on the TNC app.

### **Rationale**

This subsection is necessary to clarify that a pool-requested trip may or may have been matched with another party that requested pooled service.

## **Section 2490(b)(13). "Round"**

### **Purpose**

The purpose of this subsection is to define how to round a number with fractional components. Unless otherwise specified, numbers should be rounded up to the nearest integer for numbers with a 5 or higher in the tenths digit, or rounded down to the nearest lower integer otherwise.

### **Rationale**

This subsection is necessary to clarify the rounding procedure for final compliance numbers submitted to CARB and CPUC. It clarifies two areas of confusion with rounding: (1) whether to round to a whole number as opposed to some specified number of digits after the decimal point and (2) how to handle rounding numbers that end in 5 in the tenths digit.

### **Section 2490(b)(14). "TNC Application" or "App"**

#### **Purpose**

The purpose of this subsection is to define TNC app as the internet-based transportation service platform accessed using a mobile device or computer.

#### **Rationale**

This subsection is needed to specify the online tool with which TNCs trips are requested.

### **Section 2490(b)(15). "Transportation Network Company" or "TNC"**

#### **Purpose**

The purpose of this subsection is to define TNC as having the same meaning provided in section 5431 of the Public Utilities Code, and further applies to the entities listed in section 5450(a)(3) of the Public Utilities Code.

#### **Rationale**

This subsection is necessary for clarifying the definition of TNCs. The reference to 5450(a)(3) is necessary to expand the definition of a TNC per SB 1014. Specifically, 5450(a)(3) "applies to transportation providers regulated by the commission that provide prearranged transportation services for compensation using an online-enabled application or platform to connect passengers, including autonomous vehicles, charter-party carriers, and new modes of ridesharing technology that may arise through innovation and subsequent regulation."

### **Section 2490(b)(16). "TNC Vehicle"**

#### **Purpose**

The purpose of this subsection is to define a TNC vehicle as a personal vehicle or an autonomous vehicle used to transport passengers in connection with the TNC's online-enabled application or platform.



### **Rationale**

This section is necessary to distinguish a TNC vehicle from the common definition of vehicle.

### **Section 2490(b)(17). "Trip"**

#### **Purpose**

The purpose of this subsection is to define trip as travel from an origin to destination by vehicle, transit, or active transport that is captured on the TNC app.

#### **Rationale**

This subsection is necessary for defining what trip means. Data submitted by TNCs are on a trip-by-trip basis, thus it is important to define what constitutes a trip record.

### **Section 2490(b)(18). "Vehicle miles traveled" or "VMT"**

#### **Purpose**

The purpose of this subsection is to define vehicle miles traveled as the distance traveled by a TNC vehicle. For purposes of this regulation, VMT includes all miles traveled within the state of California for trips wholly within the border of California. In addition, VMT shall include all miles for trips that originate within California.

#### **Rationale**

This subsection is necessary to clarify that vehicle miles traveled for the purpose of this regulation does not include miles logged by TNC apps outside of California, unless those miles are of a trip that originated within California.

### **Section 2490(b)(19). "Year"**

#### **Purpose**

The purpose of this subsection is to define year as calendar year.

#### **Rationale**

This subsection is necessary for clarifying that year in the regulation refers to January 1 through December 31, inclusive. Not all regulations nor businesses refer to year as a calendar year, which can lead to confusion with regulated parties.

## **B. Requirements of the Proposed Regulation**

### **Section 2490.1. Clean Miles Standard Requirements**

The following sections describe the requirements of the proposed Clean Miles Standard regulation.

#### **Section 2490.1(a). Reporting Period**

##### **Purpose**

The purpose of this section is to specify that TNCs must meet the requirements of this section beginning in calendar year 2023.

##### **Rationale**

This section is needed to clarify that compliance for the regulation begins in 2023, per SB 1014.

#### **Section 2490.1(b). Definitions**

##### **Purpose**

The purpose of this section is to define specific terms applicable to this section.

##### **Rationale**

Definitions are included for Periods 1, 2, and 3 miles by a TNC vehicle. VMT for each period is captured separately by each TNC and is treated independently in calculating in each TNC's total VMT. As many drivers "multi-app," the act of logging onto multiple company apps at the same time creates duplicate VMT logged simultaneously with the same vehicle. As duplicate VMT occurring across different apps cannot be removed by TNCs themselves since they only have access to their own data, overall VMT in compliance records will remain a little higher than what is actually occurring in the fleet. In the 2018 data used to develop the base year inventory for this regulation, overlapping VMT was approximately 3.4 percent of total VMT by all TNCs.<sup>76</sup>

Also defined in this section is passenger mile traveled (PMT), which occurs in Period 3. This metric requires the use of compliance occupancy values provided by CARB as a look-up table. Compliance occupancy may not reflect the actual number

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<sup>76</sup> CARB, 2018 Base Year Inventory Report.

of passengers in the vehicle. This may change in a future regulation if TNCs are able to implement the recording of passenger count in the apps.

## **Section 2490.1(c). Greenhouse Gas Targets**

### **Purpose**

Existing law requires CARB to achieve the maximum degree of emissions reduction possible from mobile sources.<sup>77</sup> Section 38566 of the Health and Safety Code directs the Board to adopt rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emission reductions.

In addition to accounting for electrified TNC VMT, the GHG targets in this proposed regulation will incentivize additional emission reduction strategies by encouraging pooled rides, deadhead mile reduction, more fuel-efficient vehicles, first- and last-mile connections to transit, and investments in infrastructure to support active transportation.

### **Rationale**

In terms of GHG emissions, the transportation sector accounts for approximately 50 percent of the emissions of greenhouse gases in California. Light-duty vehicles make up 70 percent of the transportation sector's direct vehicle emissions. Further, the transportation sector emissions are not declining, pointing to the need for new actions to ensure the state can meet the aggressive SB 32 requirements. As noted in the 2017 Scoping Plan, the gap between project business as usual statewide GHG emissions (emissions that are projected to occur under existing programs) and the SB 32 requirements is very large.<sup>78</sup>

In terms of air quality, 80 percent of the NO<sub>x</sub> emissions that form smog in the state comes from vehicle tailpipe emissions.<sup>79</sup> California continues to have some of the worst air quality in the nation. According to the American Lung Association's 2020 State of the Air Report, 6 of the 10 most polluted cities in the nation for annual PM<sub>2.5</sub> are in California. Similarly, 7 of the 10 most polluted cities for ozone are in California.<sup>80</sup> These requirements are also necessary to aid in reducing these pollution burdens as benefits of the regulation.

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<sup>77</sup> Senate Bill 1014

<sup>78</sup> CARB, *Climate Change Scoping Plan*, Executive Summary, 2017, page ES4.

<sup>79</sup> CARB, *Draft 2020 Mobile Source Strategy*. November 24, 2020.

<sup>80</sup> American Lung Association, *2020 State of the Air Report*.

SB 1014 directs CARB to adopt annual greenhouse gas reduction targets for TNCs on a per-passenger mile basis, and CARB has done so here.

### **Section 2490.1(c)(1). Greenhouse Gas per Passenger Mile Targets**

#### **Purpose**

The purpose of this subsection is to provide the annual GHG targets, in g CO<sub>2</sub>/PMT, and method for calculating compliance to the regulated parties. The targets apply to individual TNCs and their statewide activities.

#### **Rationale**

This subsection is needed to define the GHG targets and provide the compliance equation used for calculating annual compliance in section 2490.1(b)(4). The GHG targets as described in Chapter III reduce annually over the period of the regulation, and is held constant at 0 g CO<sub>2</sub>/PMT from 2030 onward. The GHG targets can be met using various strategies.

### **Section 2490.1(c)(2). GHG Target Calculation and Section 2490.1(c)(3). Equation 1**

#### **Purpose**

The purpose of this subsection is to provide the equation used to calculate GHG target compliance. Compliance with GHG targets for each TNC is calculated by summing CO<sub>2</sub> emissions for all trips and dividing by total passenger miles traveled in a given calendar year.

#### **Rationale**

This subsection is needed to define the method for calculating GHG target compliance. Input values for CO<sub>2</sub> emission factors and occupancy are provided as tables in the proposed regulation.

#### *CO<sub>2</sub> Emission Rate*

A CO<sub>2</sub> emission rate look-up table was developed by CARB staff to simplify and streamline the compliance calculation process. The CO<sub>2</sub> emission rates are determined for five categories under passenger cars (PCs) and light trucks (LTs). For the PC and LT tables, a CO<sub>2</sub> emission rate is provided for each model year (MY) from 2008 to 2030 and beyond in the following categories:

- Gasoline and Flex Fuel Vehicles
- Diesel Vehicles
- Hybrid Electric Vehicles (HEV)
- Plug-in Hybrid Electric Vehicles (PHEV)
- ZEV (FCEV or BEV)

The passenger car and light truck categories are defined in the footnote of the table.

The CO<sub>2</sub> emission rates were calculated based on the 2-cycle city fuel economy data from fueleconomy.gov. The average CO<sub>2</sub> per mile rate for each category under PC and LT was determined for each model year. CARB staff then applied a speed correction factor to the CO<sub>2</sub> per mile rate to reflect a more real-world fuel consumption for TNC service miles. TNC driving was found to be more fuel-efficient on average when compared to the California light-duty fleet. The speed correction factor was derived by a test program conducted in 2019 where CARB collected real-time vehicle and engine data from 31 TNC vehicles equipped with data-loggers. Details of this study and how the speed correction factor was derived can be found in the 2018 Base Year Inventory Report.<sup>81</sup> CO<sub>2</sub> emission rates are projected for future years through 2030 based on EMFAC 2017.

### **Section 2490.1(c)(4). Tables 2 and 3**

#### **Purpose**

The purpose of this subsection is to provide the look-up tables of CO<sub>2</sub> factors for passenger cars and light trucks to use in the GHG compliance calculation.

#### **Rationale**

This subsection is necessary to specify the CO<sub>2</sub> factors that must be used in order to appropriately calculate a TNC's annual GHG compliance. The varying model years, vehicle categories, and propulsion systems correspond to different CO<sub>2</sub> factors in the provided tables. This subsection further explains that in the event a trip data is missing certain vehicle information, a CO<sub>2</sub> factor can be determined by choosing the largest value in the category for which data is available. Additionally, instructions in this subsection on determining CO<sub>2</sub> values for flex fuel vehicles and light truck categories are valuable for a TNC to properly determine their annual GHG emissions.

### **Section 2490.1(c)(5). Compliance Occupancy Values**

#### **Purpose**

The purpose of this subsection is to specify the values to be used for occupancy in the GHG compliance calculation, based on the type of TNC service provided.

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<sup>81</sup> CARB, *2018 Base Year Inventory Report*.

## Rationale

This subsection is needed to provide regulatory clarity on how to account for occupancy in GHG compliance, given the limited availability of occupancy data. Staff proposes using pre-defined occupancy factors for measuring compliance with the proposed regulation. Because of the limited availability of occupancy data and because increasing average vehicle occupancy is a difficult and potentially expensive undertaking, CARB is providing occupancy factors for three types of trips taken in TNCs that potentially have different occupancies: non-pooled, pool-requested/unmatched, and pool-requested/matched.

The pool-requested, matched occupancy value was derived by multiplying the average number of parties per matched ride and the average number of occupants per party. Staff assumed an average of two parties per matched ride, where each party has 1.25 passengers – the intermediate value between one passenger (1.0) and 1.55 (the non-pooled occupancy in the 2018 base year). With two parties per match, the default occupancy value is 2.5. This incentivizes TNCs to increase the matching of pool-requested rides. Using an occupancy value of 1.5 for non-pooled and pool-requested/unmatched rides incentivizes TNCs to increase and expand their pooled services. The compliance occupancy values to use based on trip type are shown in

Table 10.<sup>82</sup>

Table 10. Compliance occupancy values by trip type

Trip Type	Compliance Occupancy
Non-pooled	1.5
Pool-requested/unmatched	1.5
Pool-requested/matched	2.5

## Section 2490.1(c)(6). Rounding

### Purpose

The purpose of this subsection is to provide a rounding mechanism for GHG compliance calculations. Final GHG compliance values reported should be rounded up to the nearest integer if the number in the tenths place is 5 or greater. Numbers should be rounded down to the nearest integer otherwise.

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<sup>82</sup> The average size of a party requesting a pooled ride is typically smaller than the size of a party requesting a non-pooled ride. The average number of occupants in a non-pooled ride is 1.55. Setting the occupancy factor of pool-requested/unmatched rides equal to non-pooled rides provides incentives to TNCs to encourage pool-request rides.

## **Rationale**

This subsection is needed to provide a method for rounding to the TNC for compliance.

### **Section 2490.1(c)(7). Exemptions**

#### **Purpose**

The purpose of this subsection is to exempt trips on TNC apps that are requested and fulfilled as wheelchair-accessible vehicle (WAV) trips. SB 1376, the TNC Access for All Act enacted in September 2018, requires the CPUC to establish a program requiring improvement of WAV service by TNCs.<sup>83</sup> CARB and CPUC staff estimate that the percent of WAV trips in TNCs was approximately 0.1 percent in 2018.<sup>84</sup>

#### **Rationale**

This subsection is necessary to provide an exemption for WAVs, for which fully electrified or highly fuel-efficient vehicle models are currently limited. In order to ensure that improving accessible transportation service is not hampered by this regulation, trips that are requested and fulfilled as WAV trips in TNCs are not counted toward compliance calculations.

### **Section 2490.1(d). Over-compliance Credits for Greenhouse Gas Emissions per Passenger Mile Traveled**

#### **Purpose**

The purpose of this subsection is to describe the flexibility provision in the proposed regulation for the option of using over-compliance credits toward GHG targets. A TNC may be issued over-compliance credits equal to the difference between the GHG target and the TNC's calculated GHG fleet value. Over-compliance credits can be carried forward and used in the subsequent three calendar years, with unused credits expiring after three years of being accrued. This subsection defines the credit unit as g CO<sub>2</sub>/PMT.

#### **Rationale**

Providing some flexibility in compliance with the proposed regulation ensures that TNCs will meet the overall emission goals of the regulation without being hampered by any one particular year if a target is missed. These flexibilities are

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<sup>83</sup> CPUC TNC Access for All website: <https://www.cpuc.ca.gov/tncaccess/>.

<sup>84</sup> TNC Accessibility Data: <https://www.cpuc.ca.gov/General.aspx?id=3046>.

intended to prevent the penalties of the regulation from being overly punitive. Flexibilities allow TNCs to take into account years when good faith effort was made but targets were not met due to unforeseen changes in the TNC sector.

A relatively small percentage of drivers on TNC platforms account for a relatively high percentage of miles driven. Therefore, as the GHG target gets closer to zero, it becomes more costly to convert the next-highest mileage driver (the marginal driver in terms of miles) to a zero-emission vehicle. CARB has chosen, however, not to set the eVMT target to 100 percent; instead the target flat-lines at 90 percent in 2030. The 10 percent gap means that a large proportion of driver vehicles, representing a small proportion of miles, need not be replaced with zero-emission vehicles. Credits for the GHG target therefore allow the TNC some flexibility in choosing whether (and when) to convert low-mileage drivers to ZEVs.

Credits are not needed to meet the eVMT target because it represents the floor of guaranteed emission reductions—adding credits to the floor would be more simply achieved by lowering the floor. CARB has determined that a 90 percent eVMT target in 2030 is a cost-efficient and achievable target. In addition, adding an eVMT credit mechanism would add unnecessary complexity to the regulation which, to date, has not been requested by any stakeholder.

## **Section 2490.1(e). Electric Vehicle Miles Traveled Requirement**

### **Purpose**

The purpose of this provision is to address the requirement in SB 1014 to establish an electrification target as the main factor that influences GHG emission reductions from TNCs. The proposed annual electrification targets have been informed by the cost model. Electrifying this fast-growing mobility sector will help support Executive Order B-48-18 that created a statewide goal of 5 million ZEVs by 2030.

SB 1014 also highlights the Clean Energy and Pollution Reduction Act of 2015, which established a state policy of encouraging transportation electrification and requires CARB and the CEC to pursue transportation electrification, including increasing access to ZEVs for low- and moderate-income communities, through investments in vehicle charging infrastructure and the removal of regulatory barriers.

### **Rationale**

A portion of TNC drivers accumulate more miles per year compared to the average household vehicle. Drivers with high TNC mileage are ideal candidates for switching to ZEVs, as the fuel and maintenance savings can offset vehicle purchase



costs faster.<sup>85</sup> As more Californians are expected to use ride-hailing services in the future, TNCs are well-positioned to help the State meet emission reduction goals in the transportation sector.

Benefits of electrifying the TNC fleet go beyond reducing emissions from just the TNC sector. BEVs in TNCs help expose the technology to more consumers as TNC drivers and passengers share information, thereby potentially increasing BEV sales for private use.<sup>86</sup> TNCs can play a role in widespread deployment of ZEVs in the state to support statewide and regional pollution reduction goals.

## **Section 2490.1(e)(1). Electric Vehicle Miles Traveled Targets**

### **Purpose**

The purpose of this subsection is to provide electrification targets that each TNC must meet for each calendar year.

### **Rationale**

This subsection is needed to define the targets. The electrification targets as described in Chapter III increase over time and flatline at 90 percent eVMT in 2030. These targets must be met with miles driven by BEVs and FCEVs.

The targets were developed using a cost optimization model as described in Chapter III. The model takes input of total cost to the driver in one year and if the cost is zero compared to a ZEV, the model's output is a switch of that driver to a ZEV. The percentage of drivers that switch to a ZEV based on this rationale, the model calculates an eVMT percentage and staff used that to set the electrification targets.

The electrification targets ramp up slowly in the early compliance years to account for uncertainties resulting from the COVID-19 pandemic, and to ensure companies are given adequate time to transition to ZEVs. The slope of the annual eVMT targets increases as the program progresses past 2028 given the expectation that by then, capital and upfront costs of ZEVs are expected to be comparable to an ICE vehicle while the ongoing operating costs are lower, making them a preferred option for high-mileage drivers.

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<sup>85</sup> Senate Bill 1014

<sup>86</sup> CPUC, *Electrifying the Ridesourcing Sector in California*.

## **Section 2490.1(e)(2). Electrification Target Calculation and Section 2490.1(e)(3). Equation 2**

### **Purpose**

The purpose of this subsection is to provide a method for calculating company-wide eVMT for compliance in each calendar year.

### **Rationale**

This subsection provides the specific equation that a TNC must use for calculating eVMT in a given calendar year. Definitions of the terms in the equation are provided to ensure that all regulated parties calculate eVMT in a consistent manner. The subsection further specifies that the percent eVMT is calculated using Period 3 VMT from BEVs and FCEVs. Using only Period 3 miles for eVMT compliance minimizes the potential for unintended consequences, such as increased total VMT from TNCs.

## **Section 2490.1(e)(4). Rounding**

### **Purpose**

The purpose of this subsection is to specify how to round non-whole numbers for compliance.

### **Rationale**

This subsection is necessary to establish the rounding practice that shall be used by TNCs and CARB staff in determining the percent eVMT generated in a calendar year. Additionally, the use of the conventional rounding method is consistent with that used

## **Section 2490.2 Optional Credits**

### **Purpose**

The purpose of this section is to define optional credits that may be issued to TNCs for application toward compliance with the GHG targets. Credits may be earned through credit options presented in this section.

### **Rationale**

This section is necessary to convey that TNCs have the option of pursuing strategies beyond electrification to meet the GHG targets, including by reduction of VMT. The regulation will encourage active transportation and transit usage, which enables the reduction of VMT while supporting passenger miles traveled. Policies that support connections to public transit and support infrastructure for

active transportation improve transportation access for more people and have the potential to reduce VMT. These optional credits were designed per SB 1014's direction for staff to adopt a regulation that reduces VMT relative to PMT.

### **Section 2490.2(a). Credit Use Timeframe**

#### **Purpose**

The purpose of this section is to define when the credits may be earned and used. In any given calendar year starting with 2023, TNCs subject to the requirements in § 2490.1(b) may use the optional credits defined in this section for compliance with the annual GHG targets. Credits earned in this section must be used in the same year they are earned.

#### **Rationale**

This section is needed to convey that optional credits can only be used for the same year in which they were earned, meaning they cannot be banked and used for compliance in future years. Optional credits are offered as an incentive to encourage TNCs to invest in other clean modes of transport. Since these investments are not one of the primary strategies to meeting GHG targets, credits must be used toward the compliance in the calendar year in which they are earned.

### **Section 2490.2(b). Incorporating Credits into GHG Compliance Equation and Section 2490.2(c). Equation 3**

#### **Purpose**

The purpose of this section is to provide the equation used for incorporating earned CO<sub>2</sub> credits into the GHG compliance equation.

#### **Rationale**

This section is needed to provide clarity to the regulated party regarding how to apply earned credit toward compliance.

### **Section 2490.2(d). Credits for Investments in Bikeway and Sidewalk Infrastructure Projects**

#### **Purpose**

The purpose of this section is to provide an option for TNCs to earn credits from investments in the construction of new public bikeway and sidewalk infrastructure that may be applied toward meeting GHG targets. This subsection defines qualifying investments as TNC financial investments in new bikeway (i.e., Class 1, Class II, Class IV bikeway facilities) and sidewalk infrastructure improvements in

California being developed by local jurisdictions or transit agencies.<sup>87</sup> These investments shall be for projects already identified in general plans, bikeway and pedestrian master plans, or regional transportation plans. TNCs must use these plans to identify an approved project for investment. TNCs may not create a new bikeway or sidewalk project themselves to then sponsor.

The calculation method for determining the amount of credit that can be claimed using the monetary amounts invested is provided in this subsection. Credit for new bikeway and sidewalk infrastructure investments is in the unit of g CO<sub>2</sub> and would be applied towards target achievement for the number of years the infrastructure is operational. This subsection also specifies the required data and information that must be submitted for requesting this type of credit.

### **Rationale**

TNCs offer shared micromobility devices, such as bikes and scooters, on their platforms in many markets. Investing in improvements of bikeways and sidewalks would support not only the general public, but also TNCs' expansion micromobility on their platform. The use of micromobility for active transportation supports the regulation's goal of increasing PMT while reducing VMT. This section is needed to specify what type of investments qualify for earning credits, the method with which the credits should be calculated, and the information that must be submitted to request these credits.

In calculating GHG per PMT, SB 1014 requires CARB to account for the percent of miles completed by active transportation modes, including walking, biking, and other modes of active or zero-emission transportation (Pub. Utils. Code § 5450(b)(3)(B)). CARB staff have determined that providing regulatory credits for bikeway and sidewalk infrastructure would be a feasible method to support increasing active transportation through TNCs.

Through the interviews with public agencies, CARB staff identified that challenges in bike and scooter partnerships included ensuring safety, and a lack of bikeway and sidewalk infrastructure to support users. Investments in improving bikeway and sidewalk infrastructure, such as protected bike lanes, could help address these

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<sup>87</sup> Sidewalk is defined as the portion of a highway, other than the roadway, set apart by curbs, barriers, markings or other delineation (California Vehicle Code 555) primarily for the use of pedestrians and is intended to be a seamless pathway for wheelchair and white cane users, composed of a firm, stable, and slip-resistant surface (typically concrete). It should be at least 5 feet wide to provide adequate space for two pedestrians to comfortably pass or walk side by side.

concerns. The proposed regulation can promote these investments through a credit option to encourage TNCs to make investments in this space.

### **Section 2490.2(d)(1). Bikeway Infrastructure Projects**

#### **Purpose**

The purpose of this subsection is to specify that the investment funds must be made towards a Class I bikeway, Class II bikeway, or Class IV bikeway, as defined in California Streets and Highways Code Section 890.4, in order to qualify for credits.

#### **Rationale**

This subsection is needed to provide clarity on what types of bikeway infrastructure investments may qualify for credit. Investments in bikeway infrastructure encourage alternative mode use, which can reduce GHG emissions, energy consumption and VMT. Investments in bikeway infrastructure, especially delineated infrastructure can also increase connectivity by filling gaps in the infrastructure network and increase safety for the user. The bikeways covered in this section include bike paths (Class I), bike lanes (Class II), and cycle tracks (Class IV). These were selected because in interviews, local jurisdictions highlighted the need for more biking and walking infrastructure to encourage more shift. Additionally, the safest infrastructure are facilities that separate bikes and vehicles (thus Class III was excluded). Further, investments in bikeway infrastructure aligns with local and regional planning goals and programs to promote active transportation and sustainable communities.

### **Section 2490.2(d)(2). Sidewalk Infrastructure Projects**

#### **Purpose**

The purpose of this subsection is to define “sidewalk” for the purpose of qualifying for this credit as a path along the side of the roadway separated from motor vehicles by a curb dedicated to use by pedestrians in a public area. Sidewalks, for the purpose of this regulation, do not include other related infrastructure such as a pedestrian overpass, bus bay, or street furniture. The investment should fund the construction or repair of sidewalks.

#### **Rationale**

This subsection is needed to provide clarity on what types of sidewalk infrastructure investments may qualify for credits. Investments in sidewalks encourage walk trips, which can reduce GHG emissions by reducing VMT. Investments in sidewalk infrastructure can enhance connectivity to alternative modes, including public transit. Further, it directly supports the goal of SB 1014 by

reducing VMT relative to PMT and aligns with local and regional planning and promotes sustainable communities.

### **Section 2490.2(d)(3). Identified Projects**

#### **Purpose**

The purpose of this subsection is to define where projects the TNC invests in must be identified in order to qualify for credits. Projects must be identified in general plans per Government Code, section 65301, bicycle master plans per California Streets and Highways Code section 891.2, or regional transportation plans per Government Code section 65080, in 2016 or later to ensure that infrastructure investments align with local and regional jurisdictions planned projects. Further, these plans discuss the long range goals and identify investments locations for developing bikeway and sidewalk infrastructure in a city, county, or region.

#### **Rationale**

This subsection is necessary to provide clarity on the types of project investments that would qualify for earning credit in this regulation. Specifying which plans projects can be found allows TNCs to identify possible projects to invest in.

### **Section 2490.2(d)(4). Investments**

#### **Purpose**

The purpose of this subsection is to specify that investments used to qualify for credits shall not be used to also fulfill any financial or other obligation of the TNC, including civil or criminal penalty agreements.

#### **Rationale**

This subsection is necessary to limit TNCs from using investments they already made for fulfilling other obligations to claim credit under this regulation, given that the goal of credits under this program are to encourage new active transportation projects that would not have occurred otherwise. Further, it would not be appropriate for this program to grant credits to an investment that is required for compliance with a separate agreement, including any civil or criminal penalty agreements.

### **Section 2490.2(d)(5). Information Submittal Requirement**

#### **Purpose**

The purpose of this subsection is to require that the TNC must submit all information required under Section 2490.3(c)(5) in order to request credits.

## Rationale

This subsection is necessary to specify what information needs to be submitted in order to claim credits.

### Section 2490.2(d)(6). Calculating CO<sub>2</sub> Credit for Bikeway or Sidewalk Investment and Section 2490.2(d)(7). Equation 4

#### Purpose

The purpose of this subsection is to define the equation for calculating the amount of credit that a TNC may request as Equation 2. The method that should be used to calculate the bikeway and sidewalk infrastructure investment credits is as follows:

Equation 2.

$$CO_2 \text{ credit} = \frac{\text{Dollars invested}(\$) \times 907,185}{\$128 \times \text{Project Life}}$$

Calculating the CO<sub>2</sub> credit for bikeway or sidewalk projects is done by taking the dollars invested multiplied by a conversion factor of 907,185 for short tons to grams, over \$128 in dollars per ton CO<sub>2</sub> multiplied by project life. The project life is the number of years the project will be operational, which must be specified by the CEQA lead agency of the project.<sup>88</sup> The CO<sub>2</sub> credit calculated with this method can be claimed by the TNC for each year of the project life as identified by the project lead agency.

#### Rationale

This subsection is needed to provide a method for how credits for bikeway and sidewalk infrastructure investments are to be calculated. The \$128 per ton value for CO<sub>2</sub> was derived based on the cost-effectiveness values from the Congestion Mitigation and Air Quality project database compiled by FHWA.<sup>89</sup> For further

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<sup>88</sup> A project life of 15 years is assumed based on Methods to Find the Cost-Effectiveness of Funding Air Quality Projects. May 2005 ([https://ww2.arb.ca.gov/sites/default/files/2020-06/Congestion Mitigation Air%20 Quality Improvement Program cost-effectiveness methods may2005.pdf](https://ww2.arb.ca.gov/sites/default/files/2020-06/Congestion%20Mitigation%20Air%20Quality%20Improvement%20Program%20cost-effectiveness%20methods%20may2005.pdf)).

<sup>89</sup> FHWA - Cost Effectiveness Tables Summary, Table 52 ([https://www.fhwa.dot.gov/ENVIRONMENT/air\\_quality/cmaq/reference/cost\\_effectiveness\\_tables/report/costeff02.cfm#toc430165609](https://www.fhwa.dot.gov/ENVIRONMENT/air_quality/cmaq/reference/cost_effectiveness_tables/report/costeff02.cfm#toc430165609)).

details on calculating credits and data required, please see the draft regulation order in Appendix A.

## **Section 2490.2(e). Integrated Fare Transit Trips**

### **Purpose**

The purpose of this section is to provide a credit option when a TNC vehicle trip is connected to a transit trip that is verified when purchased through an integrated fare payment system. For requesting these credits, the transaction data and additional trip data as defined in section 2490.3(c)(5) of the regulation are required to be submitted to the CPUC. The maximum amount of credit that can be issued is equal to the distance of the connected vehicle Period 3 portions of the trip (in miles) multiplied by the 242 gCO<sub>2</sub>/mi<sup>90</sup> resulting in a g CO<sub>2</sub> credit. Credits requested must be earned and used in the same calendar year.

### **Rationale**

This section is necessary to define what qualifies as a TNC integrated transit trip that can be used to claim GHG credits. Cal-ITP is an example of an integrated fare program that TNC and transit agencies may use. This section also specifies the data parameters the TNCs must submit in order to request the credits and stipulates that credits must be earned in, and used for, the same calendar year. Since these credits are optional, TNCs cannot bank them to use in a later year.

Integrated fare credits only apply when a payment transaction occurs on system or application that connects a TNC to a transit agency, specifically where TNC riders can purchase transit fares. The credit may be issued to the TNC upon submitting comprehensive mobility data to verify that TNC riders are connecting with transit.

## **Section 2490.2(e)(1). Trip Purchases**

### **Purpose**

The purpose of this subsection is to specify that to qualify for optional credit, the TNC passenger must purchase the TNC trip at the same time as the mass transit trip through an integrated fare payment system. The TNC must provide verification of the TNC connections to transit, which includes: identifying the TNC trip that was connected to transit information on length of P3 portions of the TNC connected transit trip, the name of the transit agency that the fare was purchased from, the

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<sup>90</sup> A fixed vehicle emission rate was selected for this credit such that TNCs are not motivated to encourage higher emission vehicles for this type of trip. This is the average value for ICE TNC vehicles in the 2018 calendar year.



geographic location at which the TNC rider was dropped off or picked up at the transit station or transit stop, and the time at which the fare was purchased.

### **Rationale**

This subsection is necessary to clarify how a mass transit-connected trip can qualify for optional credit under the proposed regulation. The purpose of this credit is to encourage more TNC and transit connections. The integrated fares can also provide a more seamless customer experience.

## **Section 2490.2(e)(2). Amount of CO<sub>2</sub> Credit for Transit-Connected Trips and Section 2490.2(e)(3). Equation 5**

### **Purpose**

The purpose of this subsection is to define the maximum amount of credit per transit-connected trip that can be claimed by the TNC. The credit is calculated using Equation 3. The total credit for the trip equals the total Period 3 vehicle miles for that passenger, rounded to the nearest whole number as defined in section 2490.2(d)(2), multiplied by 242 g CO<sub>2</sub>/mi.

Equation 3.

$$CO_2 \text{ credit } (g \text{ CO}_2) = VMT_{T,P3}(mi) \times 242 \left( \frac{g}{mi} \right)$$

### **Rationale**

This subsection is needed in order to specify a maximum amount of credit that can be claimed per transit-connected trip so as to limit the TNC from claiming the entirety of a long-distance mass transit trip. For example, if a TNC passenger purchases short TNC vehicle trips and an Amtrak trip between Los Angeles and San Francisco on the integrated fare payment system, the TNC may only claim the length of the vehicle trip to and from the train stations, versus claiming hundreds of miles for credit.

The CO<sub>2</sub> factor given for the calculation of credit is a static value based on the 2018 California fleet average CO<sub>2</sub> emission rate, as estimated by EMFAC2017. A static value is used for the CO<sub>2</sub> emission rate in order to base the determination of credit on VMT alone, rather than vary the credit amount based on the fuel consumption of the vehicle. Thus, miles from a less fuel-efficient vehicle completing an integrated fare trip do not earn more credit for the same amount of miles traveled by a more fuel-efficient vehicle.

## **Section 2490.2(e)(4). Information Submittal Requirement**

### **Purpose**

The purpose of this subsection is to require that the TNC must submit all information required under Section 2490.3(c)(8) in order to request credits.

### **Rationale**

This subsection is necessary to define what information needs to be submitted by the TNC in order to request credits. In the Annual Compliance Report, the TNC must specify the amount of credits they are requesting for transit-connected trips. The information listed in this section will be used by the overseeing agency to verify that the credit requirements were met and the TNC can be granted the amount of credits they request. For the list of required information, see section 2490.3(c)(8) of the draft regulation order in Appendix A.

## **Section 2490.2(f). Issuing of Credits**

### **Purpose**

The purpose of this section is to specify that CARB will only issue credits to the TNC upon finding that the TNC has submitted all required information for the credit option as described in section 2490.3(c), that any supplemental information specifically requested by CARB or CPUC was submitted, that all information and data submitted are adequate for determining the amount of credit, and all other compliance requirements as described in section 2490.3 have been met.

### **Rationale**

This section is necessary to convey that a TNC must submit all required and requested information before CARB can determine if and in what amount the credits can be issued to the TNC.

This subsection also is necessary because without it, regulated parties might mistakenly believe that they could simply issue their own credits. This subsection identifies for the regulated party that CARB must first review the required information that the TNC submits and then issue credits. This helps CARB to ensure that the credit system is functioning correctly and, along with section 2490.5(b), gives CARB authority to review and potential revoke credits if problems arise.

Because SB 1014 directs CARB to set the emission targets, CARB has the authority and the responsibility to permit limited deviations from those targets. CARB therefore is the issuing agency for the credits.

## **Section 2490.3. Compliance and Reporting**

### **Purpose**

The purpose of this section is to provide guidance on the required reporting to demonstrate compliance with the annual targets.

### **Rationale**

This section is needed to ensure that the regulated parties are provided specific guidance for what types of data submittals are required, and the deadlines for which they must be submitted by, in order to be compliant.

## **Section 2490.3(a)(1). Data Submittal to Agencies**

### **Purpose**

The purpose of this subsection is to specify that upon request, a TNC must provide to CARB any information submitted to the CPUC under the proposed regulation.

### **Rationale**

This subsection is needed to ensure that CARB may receive any and all data from the TNCs as they pertain to the proposed regulation.

## **Section 2490.3(a)(2). Data Submittal to CPUC**

### **Purpose**

The purpose of this subsection is to specify that TNCs must submit all required information to the CPUC.

### **Rationale**

Under SB 1014, CARB adopts the targets while the CPUC implements and enforces the requirements of the Clean Miles Standard. Accordingly, this subsection instructs the regulated party to which agency they must submit annual data.

## **Section 2490.3(a)(3). Attachment 1**

### **Purpose**

Attachment 1 of the proposed regulation order provides the data elements required for the annual data submittal as described in section 2490.3(a). Each field for a data element is provided with a definition of the data and justification for requiring as part of the proposed regulation.

## **Rationale**

This subsection is necessary to define and justify all the data fields that TNCs should be ready to submit under this proposed regulation on an annual basis. These data will be used to determine compliance with the regulation.

### **Section 2490.3(b). Biennial Compliance Plan**

#### **Purpose**

The purpose of this provision is to require a biennial compliance plan for each TNC that is subject to this requirement. This biennial compliance plan should describe the forthcoming compliance strategy and be approved by the implementing agency.

#### **Rationale**

This subsection provides details on the applicability, timing and required elements of the biennial compliance plan. SB 1014 requires that each TNC submit a two-year plan for GHG emission reduction. Each TNC shall include in the plan their proposal for meeting the GHG and eVMT targets in the next two compliance years.

### **Section 2490.3(b)(1). Timing of the Biennial Compliance Plan**

#### **Purpose**

The purpose of this subsection is to specify that the Biennial Compliance Plans are required to be submitted beginning January 1, 2022, and every two years thereafter. The Biennial Compliance Plan is a forward-looking plan that describes the TNC's plan to comply with targets in the subsequent two years. For example, the Biennial Compliance Plan due January 1, 2022, shall cover compliance years 2023 and 2024.

#### **Rationale**

This subsection is necessary to provide clarity on when the Biennial Compliance Plans are due.

### **Section 2490.3(b)(2). Small TNC Exemptions**

#### **Purpose**

The purpose of this subsection is to exempt small or new TNCs from the requirement to submit a Biennial Compliance Plan. A TNC that exceeds 5 million VMT for the first time in an even-numbered year shall submit a Biennial Compliance Plan two years later, on or before January 1 of the next even-numbered year. A TNC that exceeds 5 million VMT for the first time in an odd-numbered year shall

submit a Biennial Compliance Plan three years later, on or before January 1 of the second even-numbered year. For example, if a TNC exceeds 5 million VMT for the first time in the year 2025, the TNC must submit a Biennial Compliance Plan on January 1, 2028. If a TNC exceeds 5 million VMT for the first time in the year 2026, the TNC must submit a Biennial Compliance Plan on January 1, 2028. A TNC that falls below 5 million VMT in a subsequent year shall submit a written request to no longer submit a Biennial Compliance Plan if they anticipate staying below 5 million VMT in future years.

### **Rationale**

This subsection is needed to exempt a small or new TNC with annual VMT less than 5 million from submitting a Biennial Compliance Plan until the TNC's annual VMT meets the threshold for being subject to the GHG and electrification targets of the proposed regulation.

## **Section 2490.3(b)(3). Biennial Compliance Plan Components**

### **Purpose**

The purpose of this subsection is to define the necessary components of a Biennial Compliance Plan. Each Plan needs to summarize strategies with which the TNC plans to meet the electrification and GHG targets, including how they will reduce deadhead miles and increase passenger occupancy. Furthermore, the Biennial Compliance Plan should include, at minimum, a TNC's two-year projected:

- Annual fleet population (number of vehicles)
- Annual fleet average fuel consumption in gCO<sub>2</sub>/mi
- Annual average vehicle occupancy
- P1 + P2 proportion of total VMT (deadhead miles)
- Total annual VMT
- Grams CO<sub>2</sub>/PMT
- BEV and FCEV proportion of fleet population
- Percent eVMT
- Any incentives planned for drivers
- Planned driver outreach activities to increase BEV or FCEV usage
- Estimated CO<sub>2</sub> credits planned to be requested to apply toward compliance with the GHG targets (refer to section 2490.2)

### **Rationale**

This subsection is necessary to define the minimum components for TNCs to include in their Biennial Compliance Plans. The information provided in the plans should demonstrate that the TNCs will increase their proportion of electric miles

and passenger miles relative to all vehicle miles, while decreasing gram-per-mile GHG emission rates as stated in SB 1014.

## **Section 2490.3(c). Annual Compliance Report**

### **Section 2490.3(c)(1). Applicability**

#### **Purpose**

The purpose of this subsection is to define who is subject to section 2490.3(c). Any TNC that exceeds 5 million VMT in a given year of operation will be required to submit a compliance summary report by March 31 following the compliance year. For example, the first compliance summary report is due on March 31, 2024, summarizing compliance for calendar year 2023.

#### **Rationale**

This subsection is necessary to provide clarity on which TNCs must submit Annual Compliance Reports.

### **Section 2490.3(c)(2). Small TNC Exemption**

#### **Purpose**

The purpose of this subsection is to exempt a new entrant or growing small TNC from the Annual Compliance Report. A TNC that does not exceed 5 million VMT in a single reporting year of operation is not required to submit an Annual Compliance Report for that calendar year. Upon request, an exempt TNC shall provide CARB with any data that would otherwise be required to be submitted under this chapter in order for CARB to verify the applicability of this exemption for the TNC.

If a TNC exceeds 5 million VMT by December 31 of a given calendar year, the TNC is subject to the regulation targets beginning the next calendar year. For example, a TNC that exceeds 5 million VMT by December 1, 2025 is subject to the regulation targets beginning January 1, 2026. The TNC then must submit their first Annual Compliance Report by March 31 following the first year of being subject to the regulation targets. In this example, the TNC that exceeds 5 million VMT by December 31, 2025, must submit an Annual Compliance Report by March 1, 2027, summarizing their compliance for calendar year 2026.

#### **Rationale**

This subsection is necessary to provide clarity on when a small TNC that grows to exceed the 5 million VMT threshold would be required to submit an Annual

Compliance Report. A small TNC may not be able to determine their annual VMT until December 31<sup>st</sup> of a given calendar year, and thus they are exempt from the targets the first year they exceed the 5 million VMT threshold. Since they are subject to the regulation targets beginning the next calendar year, a small TNC must submit an Annual Compliance Report for the first year of being subject to the regulation targets.

### **Section 2490.3(c)(3). Timing of Annual Compliance Reports**

#### **Purpose**

The purpose of this subsection is to provide a deadline for Annual Compliance Reports. A TNC shall submit an Annual Compliance Report on March 1<sup>st</sup> of each calendar year, beginning on March 1, 2024, covering the prior calendar year (from January 1 through December 31) of TNC operation. The TNC shall report its annual GHG emissions (in g CO<sub>2</sub>/PMT) and percent eVMT for the preceding compliance year. For example, the Annual Compliance Report due March 1, 2024 shall provide the g CO<sub>2</sub>/PMT and percent eVMT for calendar year 2023.

#### **Rationale**

This subsection is necessary to specify when Annual Compliance Reports are due each year. Staff chose March 1 to provide adequate time to allow for gathering report data after the close of the reporting year.

### **Section 2490.3(c)(4). Over-compliance Credits**

#### **Purpose**

The purpose of this subsection is to direct TNCs to report any over-compliance credits they intend to use, once approved by CARB. If the TNC chooses to carry forward any over-compliance credits issued to it by CARB, as described in section 2490.1(d), the TNC must report those credits they intend to use.

#### **Rationale**

This subsection is needed to specify that TNCs must include over-compliance credits being requested in the Annual Compliance Report.

Over-compliance credits represent emission reductions achieved in early years, "banked" by regulated TNCs to offset higher emissions in later years. Because these over-compliance credits are based on emission calculations and can be used to increase emissions in later years, CARB determined that such calculations are part of the legislative direction that CARB "shall establish a baseline for emissions of greenhouse gases" for TNC vehicles. If regulated TNCs could simply

automatically adjust their emissions targets based on their estimate of emissions achieved, this could circumvent CARB's duty to set the emission baseline and result in unanticipated and unwarranted emissions exceedances. Therefore, CARB determined that it should establish a mechanism, provided in this subsection, for TNCs to request that CARB issue credits for TNCs to use.

### **Section 2490.3(c)(5). Optional credits**

#### **Purpose**

The purpose of this subsection is to specify that if a TNC chooses to request and use CO<sub>2</sub> credits issued to it by CARB from the options described in Section 2490.2, the TNC must report any such credits used in its Annual Compliance Report.

#### **Rationale**

This subsection is necessary in order to provide direction for where TNCs should report optional credits for CARB approval.

Optional credits represent emission reductions achieved through means other than direct reduction of GHG emissions of TNC vehicles. Because these optional compliance credits are based on emission calculations and can be used to increase emissions in certain years, CARB determined that such calculations are part of the legislative direction that CARB "shall establish a baseline for emissions of greenhouse gases" for TNC vehicles. If regulated TNCs could simply automatically adjust their emissions targets based on their estimate of how many optional credits they should have earned, this could circumvent CARB's duty to set the emission baseline and result in unanticipated and unwarranted emissions exceedances. Therefore, CARB determined that it should establish a mechanism, provided in this subsection, for TNCs to request that CARB issue credits for TNCs to use. In addition, TNCs must first provide certain evidence to support their request for optional credits, and thus CARB needed to establish a mechanism by which that evidence could be evaluated and credits awarded.

### **Section 2490.3(c)(6). Annual Compliance Report Components**

#### **Purpose**

The purpose of this subsection is to define the minimum components required in the Annual Compliance Report. Each Annual Compliance Report should detail how the TNC calculated their GHG emissions and percent eVMT compliance values and should include, at a minimum:

- Total fleetwide vehicle population
- Total fleetwide GHG (grams CO<sub>2</sub>)



- Total fleetwide VMT
- Average compliance occupancy
- Average actual vehicle occupancy (based on real data or survey)
- Total compliance of GHG target (grams CO<sub>2</sub>/PMT)
- Number of BEVs and FCEVs in fleet population
- Number of PHEVs in fleet population
- Number of HEVs in fleet population
- Total compliance percent eVMT
- CO<sub>2</sub> credits being requested and from which credit option

### **Rationale**

This subsection is needed in order to specify what TNCs should be prepared to summarize in each Annual Compliance Report.

## **Section 2490.3(c)(7). Data Required for Bikeway and Sidewalk Infrastructure Investment Credits**

### **Purpose**

The purpose of this subsection is to define the data TNCs are required to submit in order to request GHG credits specifically from bikeway infrastructure investments. A list of required data is provided in the draft regulation order found in Appendix A.

### **Rationale**

This subsection is necessary to describe what data and information TNCs should be prepared to provide to the CPUC and CARB when requesting GHG credit for bikeway infrastructure investments. This information will be used to determine the amount of GHG credit the TNC may request, and if they meet the requirements to earn the credit.

## **Section 2490.3(c)(8). Data Required for Integrated Fare Transit Trip Credits**

### **Purpose**

The purpose of this subsection is to define the data TNCs are required to submit in order to request credits specifically from connected transit trips.

### **Rationale**

This subsection is needed to describe what data TNCs should be prepared to provide to the CPUC and CARB when requesting credit for connected transit trips. This information will be used to determine the amount of GHG credit the TNC may request, and if they meet the requirements to earn the credit.

## **Section 2490.3(d). Attestation for Reports Submitted to Agencies**

### **Purpose**

The purpose of this section is to specify that when submitting reports to CARB and CPUC, TNCs must state the following: “I certify under penalty of **perjury** under the laws of the State of California that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. I certify under penalty of **perjury** of the laws of the State of California that the statement of information submitted is true, accurate, and complete.”

### **Rationale**

This section is needed to establish a basis for enforcement if TNCs submit false information to the agencies, thereby helping to prevent such a submittal.

## **Section 2490.4. Severability and Use of Compliance Credits**

### **Purpose**

The purpose of this section is to establish that if one or some of the provisions in the proposed regulation are deemed unenforceable, the remainder shall continue to be in effect. The Executive Officer of CARB has the authority to terminate or limit use of any compliance or over-compliance credit issued under the proposed regulation. Any credit issued by CARB does not constitute property or a property right and has no monetary value. Credits cannot be traded, are not exchangeable, and must only be used for the purposes expressly set forth by the proposed regulation.

### **Rationale**

This section is necessary to preserve the overall intent of what the proposed regulation is set to achieve, even if unforeseen issues arise with enforcing any individual term of the proposed regulation. In addition, this section informs the regulated parties that any dispute regarding the issuance of credits has limited recourse—credits are not exchangeable for money and cannot be used to meet any other CARB emission requirements beyond what is specified in this regulation. Over-compliance credits represent an agreement that, in exchange for greater emission decreases early in the regulation, the regulated party may emit more in later years. Similarly, the optional credits represent an agreement that indirect emission benefits through things like increased bicycle infrastructure can take the place of more direct emission benefits. CARB therefore has a strong interest in ensuring that credits are not misused—as that may result in unanticipated emission increase—and thus this section provides CARB with authority to address any such abuses.

## **V. Benefits Anticipated from the Regulatory Action, Including the Benefits or Goals Provided in the Authorizing Statute**

The purpose of the proposed regulation is to require an increase in the use of ZEVs and reduce GHG emissions in TNC light-duty services. Since the proposed eVMT target is 90 percent by 2030, and the GHG target is equivalent to 100 percent eVMT by 2030, the regulation is an important new action to support the Governor's Executive Orders B-16-12 and B-48-18 by dramatically increasing the number of people experiencing electric vehicles. Also in 2018, Governor Brown issued executive order B-55-18, which sets a target to achieve carbon neutrality in California no later than 2045, and maintain net negative emissions thereafter. The proposed CMS regulation supports the goals of B-55-18 through increased use of electric vehicles and enabling actions to reduce VMT. Furthermore, the proposed regulation supports Governor Newsom's Executive Order N-79-20, which establishes a target to end sales of ICE passenger vehicles by 2035.

### **A. Summary of Emissions and eVMT Benefits**

The proposed CMS regulation would result in an increased use of ZEVs in TNC services, attributed to a minimum 90 percent eVMT requirement and achieving 0 GHG-equivalent emissions by 2030. Increased use of ZEVs in the TNC sector results in an increasing proportion of miles driven in California that are electric, and therefore a decrease in tailpipe GHG and criteria emissions (NO<sub>x</sub>, PM<sub>2.5</sub>). Through the proposed regulation, California will see a cumulative reduction over the period of 2023 to 2031 of 298 tons NO<sub>x</sub>, 93 tons PM<sub>2.5</sub> and 1.8 MMT of GHG emissions (well-to-wheels emissions accounting for fuel production). These emission reductions are described in further detail in Chapter VI. Beyond the electrification, emission reductions can be achieved through reduction in VMT by encouraging pooling, deadhead mile reduction, and mode shift to active transport and transit connections.

### **B. Health Benefits**

The proposed regulation reduces criteria pollutant emissions of NO<sub>x</sub> and PM<sub>2.5</sub> resulting in health benefits for Californians. These health benefits include fewer instances of premature mortality, fewer hospital and emergency room visits, and fewer lost days of work. As part of setting the National Ambient Air Quality Standard for PM, the U.S. EPA quantifies the health risk from exposure to PM. CARB relies on the same

health studies for this evaluation.<sup>91</sup> The method used in this analysis is the same as that used for the proposed Low Carbon Fuel Standard 2018 Amendments, and the Heavy-Duty Inspection Program and Periodic Smoke Inspection Program.<sup>92</sup>

CARB analyzed the following five health outcomes in the business-as-usual (BAU) projections, proposed regulation, and alternatives: cardiopulmonary mortality, hospitalizations for cardiovascular illness, hospitalizations for respiratory illness, emergency room (ER) visits for respiratory illness, and ER visits for asthma.<sup>93,94,95</sup>

These health outcomes were selected because U.S. EPA has identified them as having a *causal* or *likely causal* relationship with exposure to PM<sub>2.5</sub>.<sup>96</sup> The U.S. EPA also examined other health endpoints such as cancer, reproductive and developmental effects, but determined there was only *suggestive* evidence for a relationship between these outcomes and PM exposure, and there is insufficient data to include these endpoints in the national health assessment analyses routinely performed by U.S. EPA. As a result, we did not include them in this analysis.

The U.S. EPA has determined that both long-term and short-term exposure to PM<sub>2.5</sub> plays a *causal* role in premature mortality, meaning that a substantial body of scientific evidence shows a relationship between PM<sub>2.5</sub> exposure and increased risk of death. This relationship persists when other risk factors such as smoking rates, poverty and other factors are taken into account. While other mortality endpoints could be analyzed, the strongest evidence exists for cardiopulmonary mortality.<sup>97</sup> The greater scientific certainty for this effect, along with the greater specificity of the endpoint,

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<sup>91</sup> U.S. EPA, Health and Environment Effects of Particulate Matter (<https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm>, accessed June 2019).

<sup>92</sup> A detailed summary of the health modeling methodology is included on CARB's webpage: <https://ww2.arb.ca.gov/resources/documents/carbs-methodology-estimating-health-effects-air-pollution>

<sup>93</sup> Outcomes related to the heart or lungs

<sup>94</sup> Outcomes related to the heart or blood vessels

<sup>95</sup> Respiratory illness such as chronic obstructive pulmonary disease, and respiratory infections

<sup>96</sup> U.S. Environmental Protection Agency, "Quantitative health risk assessment for particulate matter," 2010 ([https://www3.epa.gov/ttn/naaqs/standards/pm/data/PM\\_RA\\_FINAL\\_June\\_2010.pdf](https://www3.epa.gov/ttn/naaqs/standards/pm/data/PM_RA_FINAL_June_2010.pdf)).

<sup>97</sup> U.S. Environmental Protection Agency. "Integrated science assessment (ISA) for particulate matter (Final Report, Dec 2009)." *EPA/600/R-08/139F, 2009* (2009). ([http://ofmpub.epa.gov/eims/eimscomm.getfile?p\\_download\\_id=494959](http://ofmpub.epa.gov/eims/eimscomm.getfile?p_download_id=494959)).

leads to an effect estimate for cardiopulmonary deaths that is both higher and more precise than that for all-cause mortality.<sup>98</sup>

The U.S. EPA has also determined a *causal* relationship between non-mortality cardiovascular effects and short and long-term exposure to PM<sub>2.5</sub>, and a *likely causal* relationship between non-mortality respiratory effects (including worsening asthma) and short and long-term PM<sub>2.5</sub> exposure.<sup>99</sup> These outcomes lead to hospitalizations and ER visits, and are included in this analysis.

In general, health studies have shown that populations with low socioeconomic standings are more susceptible to health problems from exposure to air pollution.<sup>100,101</sup> However, the location and magnitude of projected emission reductions resulting from many proposed regulations are not known with sufficient accuracy to account for socioeconomic impacts, and an attempt to do so would produce uncertainty ranges so large as to make conclusions difficult. CARB staff acknowledges this limitation. Table 11 shows the estimated avoided incidence of mortality and morbidity because of the proposed regulation from 2023 through 2031 by California air basin. Values in parentheses represent the 95 percent confidence intervals of the central estimate. The largest estimated health benefits correspond to regions in California with the greatest TNC activity: San Diego County, San Francisco Bay, and South Coast air basins.

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<sup>98</sup> CARB 2010, *Estimate of Premature Deaths Associated with Fine Particle Pollution*.

<sup>99</sup> U.S. EPA, *Integrated Science Assessment for Particulate Matter*

<sup>100</sup> Krewski, Daniel, et al. *Extended follow-up and spatial analysis of the American Cancer Society study linking particulate air pollution and mortality*. No. 140. Boston, MA: Health Effects Institute, 2009. (<https://ephtracking.cdc.gov/docs/RR140-Krewski.pdf>).

<sup>101</sup> Gwynn, R. Charon, and George D. Thurston. "The burden of air pollution: impacts among racial minorities." *Environmental health perspectives* 109.suppl 4 (2001): 501-506. (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1240572/>).

Table 11. Regional and statewide avoided premature deaths, hospital admissions, and emergency room visits from 2023 to 2031 under the proposed regulation from PM<sub>2.5</sub> and NO<sub>x</sub> emission reductions

Air Basin	Cardiopulmonary mortality	Hospitalizations for cardiovascular illness	Hospitalizations for respiratory illness	Emergency room visits
San Diego County	1 (1 - 1)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
San Francisco Bay	4 (3 - 5)	1 (0 - 1)	1 (0 - 1)	2 (1 - 3)
South Coast	13 (10 - 15)	2 (0 - 4)	2 (1 - 4)	7 (4 - 9)
Statewide	18 (14 - 22)	3 (0 - 5)	3 (1 - 6)	9 (6 - 13)

In accordance with U.S. EPA practice, health outcomes were monetized by multiplying incidence by a standard value derived from economic studies.<sup>102</sup> The valuation per incident is provided in Table 12. The valuation for avoided premature mortality is based on willingness to pay to avoid premature mortality.<sup>103</sup> This value is a statistical construct based on the aggregated dollar amount that a large group of people would be willing to pay for a reduction in their individual risks of dying in a year. This is not an estimate of how much any single individual would be willing to pay to prevent a certain death of any particular person, nor does it consider any specific costs associated with mortality such as hospital expenditures.<sup>104</sup>

The valuation for avoided hospitalizations and ER visits are based on a combination of typical costs associated with hospitalization and the willingness of surveyed individuals to pay to avoid adverse outcomes that occur when hospitalized. These include hospital charges, post-hospitalization medical care, out-of-pocket expenses, and lost earnings for both individuals and family members, lost recreation value, and lost household

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<sup>103</sup> National Center for Environmental Economics, et al., *Appendix B: Mortality Risk Valuation Estimates, Guidelines for Preparing Economic Analyses* (EPA 240-R-10-001, Dec. 2010) (<https://www.epa.gov/sites/production/files/2017-09/documents/ee-0568-22.pdf>, accessed September 24, 2020).

<sup>104</sup> U.S. Environmental Protection Agency, Science Advisory Board, *Valuing the benefits of fatal cancer risk reduction*, July 27, 2000 ([http://yosemite.epa.gov/sab%5CSABPRODUCT.NSF/41334524148BCCD6852571A700516498/\\$File/ee\\_acf013.pdf](http://yosemite.epa.gov/sab%5CSABPRODUCT.NSF/41334524148BCCD6852571A700516498/$File/ee_acf013.pdf), accessed September 24, 2020).

<sup>105</sup> U.S. Environmental Protection Agency, *Mortality Risk Valuation – What does it mean to place a value on a life?* (<https://www.epa.gov/environmental-economics/mortality-risk-valuation#means>, accessed August 14, 2018).

protection (e.g., valuation of time-losses from inability to maintain the household or provide childcare).<sup>105</sup>

Table 12: Valuation per incident for avoided health outcomes

Outcome	Cost-Savings per Incident (2018\$)
Avoided Premature Deaths	\$9,579,924
Avoided Cardiovascular Hospitalizations	\$56,588
Avoided Acute Respiratory Hospitalizations	\$49,359
Avoided ER Department Visits	\$810

### C. Greenhouse Gas Reduction Benefits – Social Cost of Carbon

The proposed regulation would result in an estimated cumulative net reduction in CO<sub>2</sub> emissions between 2023 and 2031 totaling 1.81 million metric tons (MMT).

The monetary value of these GHG reductions can be estimated using the social cost of carbon (SC-CO<sub>2</sub>), which provides a dollar valuation of the damages caused by one ton of carbon pollution and represents the monetary benefit today of reducing carbon emissions in the future.

The Council of Economic Advisors and the Office of Management and Budget convened an Interagency Working Group on the Social Cost of Greenhouse Gases (IWG) to develop a methodology for estimating the social cost of carbon (SC-CO<sub>2</sub>). This methodology relied on a standardized range of assumptions and could be used consistently when estimating the benefits of regulations across agencies and around the world.<sup>106</sup>

In this analysis, CARB utilized the current IWG supported SC-CO<sub>2</sub> values to consider the social costs of actions to reduce GHG emissions. This is consistent with the approach presented in the Revised 2017 Climate Change Scoping Plan and is in line with Executive Orders including 12866 and the Office of Management and Budget

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<sup>105</sup> Chestnut, *The economic value of preventing respiratory and cardiovascular hospitalizations*

<sup>106</sup> Additional technical detail on the IWG process is available in the Technical Updates of the Social Cost of Carbon for Regulatory Impact Analysis – Under Executive Order 12866 (by the Interagency Working Group on Social Cost of Greenhouse Gases, United States Government). Iterations of the Updates: <https://obamawhitehouse.archives.gov/sites/default/files/omb/inforeg/scc-tsd-final-july-2015.pdf>, and [https://obamawhitehouse.archives.gov/sites/default/files/omb/inforeg/scc\\_tsd\\_final\\_clean\\_8\\_26\\_16.pdf](https://obamawhitehouse.archives.gov/sites/default/files/omb/inforeg/scc_tsd_final_clean_8_26_16.pdf).

Circular A-4 of September 17, 2003.<sup>107</sup> It reflects the best available science in the estimation of the socio-economic impacts of carbon.<sup>108</sup>

The IWG describes the social costs of carbon as follows:

*The social cost of carbon (SC-CO<sub>2</sub>) for a given year is an estimate, in dollars, of the present discounted value of the future damage caused by a 1-metric ton increase in carbon dioxide (CO<sub>2</sub>) emissions into the atmosphere in that year, or equivalently, the benefits of reducing CO<sub>2</sub> emissions by the same amount in that year. The SC-CO<sub>2</sub> is intended to provide a comprehensive measure of the net damages – that is, the monetized value of the net impacts- from global climate change that result from an additional ton of CO<sub>2</sub>.*

*These damages include, but are not limited to, changes in net agricultural productivity, energy use, human health, property damage from increased flood risk, as well as nonmarket damages, such as the services that natural ecosystems provide to society. Many of these damages from CO<sub>2</sub> emissions today will affect economic outcomes throughout the next several centuries.<sup>109</sup>*

The SC-CO<sub>2</sub> is year-specific and is highly sensitive to the discount rate used to discount the value of the damages in the future due to CO<sub>2</sub>. The SC-CO<sub>2</sub> increases over time as systems become more stressed from the aggregate impacts of climate change and future emissions cause incrementally larger damages. A higher discount rate decreases the value today of future environmental damages. This analysis uses the IWG standardized range of discount rates from 2.5 to 5 percent to represent varying valuations of future damages. Table 13 presents the range of IWG SC-CO<sub>2</sub> values by year.<sup>110</sup>

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<sup>107</sup> CARB, *2017 Climate Change Scoping Plan*

<sup>108</sup> Office of Management and Budget, Circular A-4 (Sept. 2003).  
<https://www.transportation.gov/sites/dot.gov/files/docs/OMB%20Circular%20No.%20A-4.pdf>.

<sup>109</sup> National Academies of Sciences, *Updating Estimation of Carbon Dioxide*, 2017

<sup>110</sup> The SC-CO<sub>2</sub> values are of July 2015 and are available at: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis - Under Executive Order 12866 (Revised July 2015) (<https://obamawhitehouse.archives.gov/sites/default/files/omb/inforeg/scc-tsd-final-july-2015.pdf>). Values were converted to 2018 dollars using California Department of Finance CPI for All Urban Consumers.



Table 13: SC-CO<sub>2</sub>, 2020-2035 (in 2018\$ per metric ton)

Year	5 Percent Discount Rate	3 Percent Discount Rate	2.5 Percent Discount Rate
2020	\$15	\$53	\$78
2025	\$18	\$58	\$85
2030	\$20	\$63	\$92
2035	\$23	\$69	\$98

If all GHG emissions reductions under the proposed regulation are assumed to be CO<sub>2</sub> reductions, the SC-CO<sub>2</sub> from 2023 through 2031 is the sum of the annual GHG emissions reductions multiplied by the SC-CO<sub>2</sub> in each year. The estimated benefits from the proposed regulation from 2023 through 2031 are estimated to range from \$35 million to \$163 million depending upon the discount rate as shown in

Table 14.

It is important to note that the SC-CO<sub>2</sub>, while intended to be a comprehensive estimate of the damage caused by carbon globally, does not represent the cumulative cost of climate change and air pollution to society. There are additional costs to society outside of the SC-CO<sub>2</sub>, including costs associated with changes in co-pollutants, the social cost of other GHGs, including methane and nitrous oxide, and costs that cannot be included due to modeling and data limitations. The Intergovernmental Panel on Climate Change (IPCC) has stated that the IWG SC-CO<sub>2</sub> estimates are likely underestimated due to the omission of significant impacts that cannot be accurately monetized, including important physical, ecological, and economic impacts.

Table 14: Social cost of carbon (million 2018\$) from 2023 through 2031

Year	GHG emission reductions (MMT CO <sub>2</sub> )	5 Percent Discount Rate (\$)	3 Percent Discount Rate (\$)	2.5 Percent Discount Rate (\$)
2023	0.01	0.21	0.71	1.04
2024	0.03	0.43	1.44	2.12
2025	0.07	1.22	4.01	5.93
2026	0.14	2.54	8.25	12.16
2027	0.22	4.05	13.04	19.17
2028	0.28	5.34	17.00	24.93
2029	0.34	6.57	20.73	30.33
2030	0.36	7.24	22.61	33.01

2031	0.37	7.55	23.48	34.07
Total	1.81	35.15	111.25	162.77

**D. Benefits to Utility Providers**

The proposed regulation will increase the total amount of eVMT in the state, which in turn will increase the amount of electricity supplied by utility providers. Currently, the charging of BEVs represents the single largest growth area for electric utility companies as traditional areas of growth have been slowed by energy conservation efforts.

The proposed regulation also helps the state’s investor-owned utilities meet the goals of SB 350, the Clean Energy and Pollution Reduction Act of 2015. SB 350 requires the state’s investor-owned utilities to develop programs “to accelerate widespread transportation electrification,” with goals to reduce dependence on petroleum, increase the adoption of zero-emission vehicles, help meet air quality standards, and reduce greenhouse gas emissions. San Diego Gas & Electric has proposed extensions to earlier light-duty EV infrastructure pilot programs that are awaiting CPUC decision. Southern California Edison has been approved for their extension of earlier light-duty EV pilots. Pacific Gas & Electric has been approved for a direct current fast charging make-ready program, and the three smaller investor-owned utilities have also been approved for light-duty EV infrastructure programs. Furthermore, all three large investor-owned utilities have either proposed or have been approved to establish new electricity rates for commercial ZEV infrastructure use cases. By ensuring additional eVMT will be available to make use of these utility investments and rates, the proposed regulation supports the utilities’ programs and the goals of SB 350.

**E. Expanding ZEV Awareness**

As more ZEVs penetrate into ride-hailing services, they will bring awareness of ZEVs to riders served by TNCs and to communities where drivers live and drive. Since ride-hailing platforms serve many riders, they will raise public exposure and awareness.<sup>111</sup> Drivers’ awareness and experiences with ZEVs will also grow, and TNCs can help guide them to these vehicles through rental programs as well as information on purchase incentives. Finally, the zero-emission vehicles used for TNCs may also be leveraged for other services such as food and package delivery since many of the TNC drivers drive for these other services, and likely would use the same vehicle.

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<sup>111</sup> ICCT, *Consumer EV Awareness*.

## **F. Other Societal Benefits**

There are several areas of additional potential benefits that are not quantified in this analysis. Staff anticipates added benefit of reduced VMT in some areas from this regulation due to encouraging reduction in deadhead miles, use of transit and active transportation, and shared rides facilitated by TNCs. These efforts would contribute to regional public plans to reduce local emissions, and create more sustainable communities. Separately, ZEVs offer other benefits to TNC drivers when compared to ICE vehicles beyond what is analyzed here. ZEVs are quiet and have a smoother ride than ICE vehicles (no engine vibrations and single speed acceleration) and therefore provide a more comfortable vehicle, providing physical health benefits for TNC drivers spending hours in the vehicle each day.

## **VI. Emissions**

This chapter will lay out the methodology for determining the projected baseline and summarize the GHG and criteria emissions impacts in California due to the proposed CMS regulation on the TNC and California fleet. It also includes an overview of the historical base year emissions, baseline inventory, and emission benefits from the California light-duty fleet. The emissions impact of the proposed regulation is evaluated using the compliance scenario where GHG target compliance is met with 100 percent eVMT. Although the TNCs have other options to comply, we do not know the costs associated with all the options. The compliance scenario is compared against the baseline of a business as usual (BAU) scenario for the analysis period of 2021 to 2031.

### **A. Base Year Emissions Inventory (2018)**

SB 1014 directs staff to establish the base year inventory by January 2020 using 2018 as the base year. CARB staff, in collaboration with the CPUC, requested trip data from all permitted TNCs. After several iterations of data transfers, CARB staff began analyzing the dataset of approximately 1.4 billion trip records.

A complex data cleaning process was conducted to address overlapping miles by multiple companies in Periods 1 and 2, due to what is termed 'multi-apping,' in which TNC drivers are logged into multiple platforms simultaneously to maximize the number of ride requests they receive. Details of how overlapping miles were treated are found in the Base Year Report in Appendix B. Following the data clean-up and removal of overlapping miles, CARB staff determined the total TNC fleet-wide VMT for 2018 to be approximately 4.22 billion miles.

In 2019, CARB staff conducted a test program with the help of TNC drivers in northern and southern California during which a small number of drivers were asked to complete TNC trip diaries and their vehicles were equipped with a data-logger for a period of two weeks. From trip diaries of 31 drivers, CARB staff determined an average passenger occupancy of 1.54 for non-pooled trips (2,418 trips), and 1.57 for pooled trips (336 trips). Using total VMT and average occupancies, CARB staff determined the passenger miles traveled, which is miles driven with at least one passenger in the car, not including the driver.

To determine total CO<sub>2</sub>-equivalent emissions for the TNC fleet, CARB staff estimated TNC-specific fuel consumption. The CARB test program was used to collect information on in-use emissions and activity data for TNC operations. The data were used to develop speed correction factors to adjust fuel consumption rates for TNC driving conditions, which entailed lower average speeds according to the data-logger study. The 2018 base year vehicles' CO<sub>2</sub> emissions were calculated with the TNC speed correction factor applied.

The resulting TNC emission rate for the 2018 base year was 301 g CO<sub>2</sub>/PMT. Details on the assumptions and methodology used for developing the TNC base year emissions, including tables and figures, can be found in the Base Year Report (Appendix B).

## **B. Baseline Information—Business as Usual (BAU) Scenario**

To estimate the impacts of the proposed regulation, a business-as-usual (BAU) scenario projection was developed which serves as the baseline without the proposed regulation. The BAU scenario uses the latest data available on vehicle population, TNC activity in California and the 2018 base year inventory. The BAU scenario forecasts future year values for TNC VMT activity, TNC vehicle populations, GHG and criteria emissions, and gCO<sub>2</sub>/PMT in the absence of the proposed regulation. Since the TNC fleet is part of the California fleet, all vehicle population, mileage, and emission information are derived from the EMFAC2017 model.

The BAU scenario reflects implementation of currently existing state and federal regulations. Staff developed the BAU forecast activity using the 2018 base year TNC data, TNC region-specific growth assumptions, and other TNC BAU scenario assumptions as presented below. To estimate emissions, staff also developed California-specific criteria and GHG emission rates that reflect future improvements in emission control technologies and fuel combusted, as well as TNC fleet and driving characteristics. Assumptions used in developing the BAU forecast scenario are summarized below.

### ***BAU Scenario Assumptions***

The BAU scenario adopted assumptions on TNC fleet and operation characteristics including occupancy, deadheading, percent eVMT, ZEV technology fleet mix, vehicle class population fleet mix, and vehicle age distribution. Table 15 presents the assumptions used in the BAU scenario. Many of these assumptions were developed at the regional level, where a region is defined by sub-area and urbanicity level. A sub-area is the geographic designation of an area that is cross-classified by county, air basin and air district. Urbanicity, in the context of SB 1014, is a geographical designation of areas based on the unique characteristics of the region such as socioeconomic status, TNC activity, and transportation infrastructure. The defined urbanicity helps CARB staff to form region-specific and urbanicity-specific assumptions, including eVMT and deadhead miles for the BAU and regulatory scenarios assessment by urbanicity.

Table 15. BAU assumptions for TNC fleet and operation characteristics

<b>Inputs</b>	<b>Assumptions</b>
% eVMT (ratio of TNC eVMT to total VMT)	Growing from TNC 2018 base year percent eVMT, assumes the same growth rates relative to 2018 as in CARB on-road emission model (EMFAC 2017), which are based on Advanced Clean Car compliance. <sup>112</sup>
BEV/FCEV/PHEV split	Represents the fraction of all TNC ZEV and PHEV vehicles that are either a BEV, FCEV, or PHEV. Fractions assumed to be same as 2018 base year.
Utility factor for PHEV	This is the fraction of a PHEV's mileage from electricity. Assumed to be same as in 2018 base year inventory (22.7%). See Base-year Report (Appendix B, page 36).
Occupancy	TNC fleet-wide average occupancy of 1.55, consistent with 2018 base year analysis. See Base-year Report (Appendix B, page 44).
% Deadhead miles	Same as in 2018 base year TNC data, by sub-area and urbanicity
Vehicle classification fleet mix	Same car/truck distribution as 2018 base year TNC data by sub-area and urbanicity for all years
Vehicle age distribution	Same vehicle age distribution as 2018 base year TNC data by sub-area and urbanicity for all years
Connection to transit	Negligible for all years and all regions as in 2018 base year inventory
Connection to active transportation	Negligible for all years and all regions as in 2018 base year inventory
TNC Market Growth	Projection based on historical growth trends

### ***BAU Percent eVMT for TNCs***

In the BAU scenario, the TNC percent eVMT is assumed to grow at the same relative growth rate as the percent eVMT for California light-duty vehicles projected in the EMFAC2017 fleet inventory model, which accounts for the ZEV regulation requirements. For TNC fleets, while the percent eVMT varies by region in the base

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<sup>112</sup> CARB LEV III Program (<https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program/lev-program/low-emission-vehicle-lev-iii-program>).

year, the same eVMT growth rates with reference to the 2018 base year are applied for all regions.

### ***BAU TNC VMT and Vehicle Population***

The TNC VMT projection under BAU reflects the TNC market growth, as well as projected percent eVMT growth and other assumptions presented earlier. TNC vehicle class population mix and age distributions remain the same as in the 2018 base year. Applying the market growth projections in this manner assumes that in future years, there would be a similar distribution of low-mileage and high-mileage drivers as in the 2018 base year TNC fleet.<sup>113</sup>

### ***BAU GHG Emission Forecast***

In general, the BAU forecast of GHG emissions for TNCs was developed using the following steps:

- Map the 2018 base year TNC activity data to geographic classifications including sub-area and urbanicity groups based on trip-start ZIP codes. The base year TNC activity and emission development is discussed in detail in the Base Year Report found in Appendix B. Staff classified the TNC activities by EMFAC2017 vehicle classifications and fuel type based on VIN.
- The TNC activities are forecasted into future years using assumptions of Period 3 growth, deadheading ratio, and occupancy. eVMT and VMT by internal combustion engines are then recalculated using the eVMT growth assumption identified in Table 15.
- Lastly, staff developed the emission rates specified by calendar year, sub-area, vehicle class, fuel type and model year, using a combination of EMFAC2017 emission rates and 2018 base year emission rates, so that these emission rates reflect TNC driving conditions.

## **C. Emissions Impact of the Proposed Regulation**

This section quantifies the emissions impacts of the proposed regulation. To model emissions under the proposed scenario, eVMT are forecasted based on the ZEV population projected by the cost model discussed in Chapter III. In the modeling and

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<sup>113</sup> This analysis utilized the unique VIN patterns to estimate TNC populations in each year. Before applying the TNC market growth factors, vehicles with total Period 1, 2, and 3 miles equaling less than one and vehicles with zero Period 3 miles were removed. This results in a 2018 base year fleet size of approximately 537,000 vehicles.

analysis, staff assumed that this regulation does not increase the total number of ZEVs in California, which is projected by the ZEV regulation. Rather, staff assumed that more ZEVs are shifting from private driving into TNC service under proposed regulation, and a ZEV in TNC service is driven more miles per year than it is by a non-TNC owner. The emission benefits are assessed based on such increased incremental use of ZEVs. The proposed regulation will result in statewide incremental increases in eVMT and decreases in NO<sub>x</sub>, PM2.5, and GHG emissions.

To calculate the net emission benefits, for each additional ZEV in the TNC fleet under the compliance scenario, staff compared its annual eVMT in the TNC service with the annual eVMT the same vehicle would have driven as a normal California non-TNC ZEV.<sup>114</sup> The incremental eVMT is calculated as the sum of the incremental mileage that all ZEVs produced when driving in TNC services. The net emissions are assessed by calculating the difference between the emissions associated with incremental eVMT, and those emissions associated with the same amount of gasoline VMT that the eVMT are replacing. These emission impacts account for both the vehicle direct emissions as well as the upstream fuel production and delivery emissions.

Figure 3 illustrates the impact on statewide eVMT in million miles per year from the start of compliance to the year 2031. The proposed regulation is expected to add approximately 2 billion eVMT to California's light-duty fleet in 2030.

By 2031, statewide eVMT for the total light-duty sector is expected to increase 24.5 percent as a result of the proposed regulation. While the proposed regulation requires TNC drivers to use ZEVs, these ZEVs may also be used for non-TNC daily travel, namely, off-platform driving. However, eVMT from off-platform daily driving activity should be credited to the ZEV regulation and not this proposed regulation. It should also be noted that the emission impacts may spill over to other industries such as food and package delivery if those same drivers multi-app in these other services. Such activity is not accounted for in this analysis since SB 1014 is specific to passenger service only, not food and goods-delivery services. Therefore, the benefit could potentially be greater than estimated here, as ZEV drivers in TNCs also drive for other purposes.

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<sup>114</sup> "Annual eVMT of the same vehicle" refers to the VMT of a vehicle of the same fuel type, vehicle class, model year, age, and region as estimated in the EMFAC2017 model.



The emissions inventory for the proposed regulation was created by running the EMFAC2017 model to estimate the vehicle fleet's tank-to-wheel (TTW) emissions. To estimate upstream fuel production emissions, or well-to-tank (WTT) emissions, staff included emissions from fuel production facilities such as electricity power plants and gasoline refineries, in addition to fuel feedstock collection (e.g., crude oil extraction from in-state wells) and finished fuel transportation and distribution (e.g., through pipelines and with fuel tanker trucks). The emission factors for gasoline fuels were developed based on California-specific data, including Low Carbon Fuel Standard (LCFS) reporting data, CEIDARS/CEPAM, and CA-GREET, while considering LCFS compliance scenarios for the carbon content of fuels. Emission factors reflect compliance with SB 100 Renewable Portfolio Standard requirements for the electrical grid.<sup>115</sup> The proposed regulation increases electricity and hydrogen consumption while reducing gasoline consumption compared to the BAU scenario.

Table 16 presents the projected percent change in eVMT as well as fuel and electricity use compared to the light-duty vehicle fleet reference.

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<sup>115</sup> SB 100 requires that renewable energy and zero-carbon resources supply 100 percent of electric retail sales to end-use customers by 2045. For renewable source target in a specific year, refer to [https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill\\_id=201720180SB100](https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100).

Table 17 presents WTW impacts for GHG, NO<sub>x</sub> and PM<sub>2.5</sub> as a result of the proposed regulation in comparison to the California light-duty fleet reference.

Table 16. Statewide changes for eVMT, fuel use, and electricity use

	eVMT		Gasoline (billion gal/year)		Electricity (MWh/year)	
	LDV Fleet Reference	Proposed Regulation	LDV Fleet Reference	Proposed Regulation	LDV Fleet Reference	Proposed Regulation
2023	3.36	1.9%	11.250	-0.01%	1,839,001	0.84%
2024	4.03	3.5%	10.892	-0.03%	2,169,659	1.49%
2025	4.76	8.3%	10.501	-0.09%	2,509,562	3.56%
2026	5.36	14.8%	10.198	-0.18%	2,799,517	6.29%
2027	5.92	20.6%	9.955	-0.28%	3,068,745	8.67%
2028	6.44	23.6%	9.745	-0.35%	3,306,599	9.90%
2029	6.92	25.4%	9.559	-0.42%	3,533,168	10.57%
2030	7.37	25.4%	9.398	-0.45%	3,727,374	10.52%
2031	7.76	24.5%	9.237	-0.46%	3,889,248	10.11%

Table 17. Changes for NO<sub>x</sub>, PM<sub>2.5</sub> and GHG emissions (well-to-wheel)

	WTW NO <sub>x</sub> (tons/year)		WTW PM <sub>2.5</sub> (tons/year)		WTW GHG (MMT/year)	
	LDV Baseline	Proposed Regulation	LDV Baseline	Proposed Regulation	LDV Baseline	Proposed Regulation
2023	42,611	0.00%	8,258	-0.01%	114.3	-0.01%
2024	39,008	-0.01%	8,189	-0.02%	110.7	-0.02%
2025	35,919	-0.03%	8,094	-0.05%	106.8	-0.07%
2026	33,560	-0.07%	8,041	-0.09%	103.7	-0.14%
2027	31,631	-0.11%	8,012	-0.14%	101.3	-0.22%
2028	30,041	-0.15%	7,989	-0.18%	99.1	-0.28%
2029	28,677	-0.20%	7,967	-0.21%	97.2	-0.35%
2030	27,537	-0.22%	7,952	-0.23%	95.6	-0.38%
2031	26,531	-0.23%	7,924	-0.23%	94.0	-0.39%

In 2030, the values in

Table 17 amount to a 0.22 percent reduction in NO<sub>x</sub>, 0.23 percent reduction in PM<sub>2.5</sub> and 0.38 percent reduction in GHG emissions relative to the baseline.

## VII. Environmental Analysis

### A. Determination of CEQA Exemption

This chapter provides the basis for CARB's determination that the proposed regulation is exempt from the requirements of the California Environmental Quality Act (CEQA). A brief explanation of this determination is provided in Section B below. CARB's regulatory program, which involves the adoption, approval, amendment, or repeal of standards, rules, regulations, or plans for the protection and enhancement of the State's ambient air quality, has been certified by the California Secretary for Natural Resources under Public Resources Code section 21080.5 of the California Environmental Quality Act (CEQA) (14 CCR 15251(d)). Public agencies with certified regulatory programs are exempt from certain CEQA requirements, including, but not limited to, preparing environmental impact reports, negative declarations, and initial studies. CARB, as a lead agency, prepares a substitute environmental document (referred to as an "Environmental Analysis" or "EA") as part of the Staff Report prepared for a proposed action to comply with CEQA (17 CCR 60000-60008). If the proposed regulation is finalized, a Notice of Exemption will be filed with the Office of the Secretary for the Natural Resources Agency and the State Clearinghouse for public inspection.

### B. Analysis

#### *Class 8 and "Common Sense" Exemption*

CARB staff has determined that the proposed regulation is exempt from CEQA under the general rule or "common sense" exemption (14 CCR 15061(b)(3)). CEQA Guidelines state "the activity is covered by the general rule that CEQA applies only to projects which have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA." The proposal is also categorically exempt from CEQA under the "Class 8" exemption (14 CCR 15308) because it is an action taken by a regulatory agency for the protection of the environment.

The proposed regulation requires TNC services to use an increasing number of ZEVs, compared to the TNC baseline; however, there are no additional new sales requirements beyond the Advanced Clean Cars regulations on automakers.

Additionally, the charging infrastructure that is continuing to be built out for ZEVs in California is adequate for supporting those ZEVs in TNC services. Although the proposed regulation will not require a scale-up of charging infrastructure, it is possible that TNC ZEV drivers will have unique electric charging needs compared to the average household ZEV driver. In addition to electrification, TNCs may use other strategies including increasing shared rides (pooling), reducing deadhead miles, and driving more miles using fuel-efficient vehicles. In general, the increased use of pooling where more riders share vehicles, and reducing deadhead miles, specifically in Period 1, is expected to decrease VMT relative to PMT and therefore reduce emissions. Mode shift is also encouraged by offering optional credits for active transport infrastructure and connection to transit. Environmental benefits with this strategy primarily come from a reduction in VMT.

Based on CARB staff's review it can be seen with certainty that there is no possibility that the proposed regulation may result in a significant adverse impact on the environment. Further, the proposed action is designed to protect the environment, and CARB found no substantial evidence indicating the proposal could adversely affect air quality or any other environmental resource area, or that any of the exceptions to the exemption applies (14 CCR 15300.2). Therefore, this activity is exempt from CEQA.

### **VIII. Environmental Justice**

State law defines environmental justice as the fair treatment and meaningful involvement of people of all races, cultures, incomes, and national origins, with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies (Gov. Code, § 65040.12, subd. (e)(1)). Environmental justice includes, but is not limited to, all of the following: (A) The availability of a healthy environment for all people. (B) The deterrence, reduction, and elimination of pollution burdens for populations and communities experiencing the adverse effects of that pollution, so that the effects of the pollution are not disproportionately borne by those populations and communities. (C) Governmental entities engaging and providing technical assistance to populations and communities most impacted by pollution to promote their meaningful participation in all phases of the environmental and land use decision making process. (D) At a minimum, the meaningful consideration of recommendations from populations and communities most impacted by pollution into environmental and land use decisions (Gov. Code, § 65040.12, subd. (e)(2)). The Board approved its Environmental Justice Policies and Actions (Policies) on December 13, 2001, to establish a framework for incorporating environmental justice into CARB's programs consistent with the directives of State law (CARB 2001). These policies apply to all communities in California, but are intended to address the

disproportionate environmental exposure burden borne by low-income communities and communities of color. Environmental justice is one of CARB's core values and fundamental to achieving its mission.

CARB staff believes that it is important to assess how the proposed regulation may impact TNC drivers, particularly those from low income households who do not have access to capital to purchase a ZEV even in later compliance years when the eVMT targets ramp up quickly. However, limited data exists publicly on TNC drivers' socioeconomic status (SES) information and staff did not have access to sensitive information such as driver home addresses. CARB staff thus relied on existing literature, TNC-led survey results, and vehicle registration ZIP codes. The registration ZIP codes were used as a surrogate to determine what portion of the TNC drivers in the 2018 dataset may be from communities of concern.

Though vehicle registration ZIP codes may not always represent the driver's residential address and a driver's residence in a low-income community does not necessarily indicate the driver's income, the vehicle registration ZIP code was the best data available. From the ZIP codes in the 2018 TNC dataset, CARB staff found that approximately 56 percent of TNC drivers could potentially be from low-income or disadvantaged communities as defined pursuant to SB 535 and AB 1550.

It is also important to consider how the proposed regulation may impact low-income TNC riders. This regulation promotes increased access to lower fares from shared TNC rides.

## **A. TNC Drivers**

Given the large portion of drivers who may be from low-income or disadvantaged communities, CARB staff has taken a careful approach to designing the regulation targets. To minimize the impact to low- and moderate-income TNC drivers, staff optimized the payback period in the cost model to determine the appropriate eVMT targets for each compliance year. The cost model assumes that a driver will only switch to a ZEV if the payback is relatively quick, where the upfront and ongoing costs break even within a year. The cost model assumptions are outlined in Chapter III.

Staff reviewed literature and other survey results from driver-focused study efforts to gain a better understanding of TNC driver perspectives. Staff engaged with online gig worker resources, such as The Rideshare Guy, and driver representation groups to inform drivers about the proposed rulemaking and solicit their input. The outreach included providing information on currently available incentives for the purchase or lease of a ZEV.

For public workshops, staff distributed notices to TNC driver-related organizations including online driver resources and driver representation groups. A TNC driver who was invited to participate in a CARB-led working group provided valuable feedback regarding his positive experience using a long-range ZEV for TNC driving. Driver-specific virtual meetings were held to explain the proposed regulation to any TNC driver willing to participate. During the virtual meetings, CARB staff facilitated a question-and-answer session to ask drivers about their perspectives on ZEVs and to listen to their concerns and insights. Engaging TNC drivers has been challenging due to the fact that they are not the regulated party, and the uncertainties in their employment status created by the opposing AB 5 and Proposition 22 efforts were a significant concern.<sup>116,117</sup>

CARB staff are exploring ways in which information about existing purchase and lease incentives for clean vehicles can be best shared with TNC drivers. One option would be to have the TNCs share useful resources, such as links to incentive websites, through in-app notifications or e-mails to their drivers. This would be an effective way to get incentive information into the hands of TNC drivers. Current available vehicle and electric charger incentive programs in California are described in Table 18.

The CPUC currently collects ride fare data on a trip-by-trip basis; however, reliable data on driver revenue is lacking.

Table 18. Current available vehicle incentive programs for California individuals

<b>PROGRAM</b>	<b>TYPE</b>	<b>AMOUNT and LIMITS</b>
Clean Fuels Reward Program <a href="https://cleanfuelreward.com/">https://cleanfuelreward.com/</a>	Rebate for new vehicle purchase or lease	Up to \$1,500
Clean Vehicle Rebate Project (CVRP) <a href="https://energycenter.org/program/clean-vehicle-rebate-project">https://energycenter.org/program/clean-vehicle-rebate-project</a>	Rebates for new clean vehicle purchases	Up to \$7000 to income-eligible applicants
Clean Cars 4 All	Grants to scrap older, high-polluting vehicle and replace with clean	Up to \$9500 for income-eligible applicants

<sup>116</sup> California Legislature, Assembly Bill 5, signed on September 18, 2019 ([https://leginfo.ca.gov/faces/billTextClient.xhtml?bill\\_id=201920200AB5](https://leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=201920200AB5)).

<sup>117</sup> California Proposition 22, App-Based Drivers as Contractors and Labor Policies Initiative (2020) (<https://vig.cdn.sos.ca.gov/2020/general/pdf/topl-prop22.pdf>).

(available in four air districts: Sacramento, Bay Area, San Joaquin Valley, South Coast) <a href="https://ww2.arb.ca.gov/our-work/programs/clean-cars-4-all">https://ww2.arb.ca.gov/our-work/programs/clean-cars-4-all</a>	vehicle or other mobility mode	
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Other ways in which TNCs could leverage the Low Carbon Fuel Standard (LCFS) program include at least these four approaches:

1. **Charging infrastructure:** The TNCs could invest in public DCFC sites designated for TNC drivers or partner with electric vehicle service providers (EVSPs) to provide reliably available and lower-cost charging services for their drivers. Credits earned from the LCFS program, either capacity-based or dispensed electricity-based, could in turn be sold to generate revenue.
2. **Install in-home meters:** The TNCs could partner with Load Servicing Entities (LSE) and install in-home meters for EV charging for TNC drivers. This would allow TNCs/LSEs to capture the incremental credit for matching the amount of charging with low-carbon intensity electricity (using Renewable Energy Credit purchase and retirement). The incremental credit accounts for the difference between the average grid carbon intensity and the low-carbon intensity electricity. This incremental credit value could be used to help lower electricity rates for these drivers as well as provide green marketing content for the TNCs.
3. **Used EVs:** It is very likely that one or more of the utilities will be establishing a program for used EV rebates in the next year or two (by the time the CMS regulation goes into effect). The used EV rebate would be conceivably funded through the portion of a utility’s LCFS credit revenue that is not contributed by the utility to the Clean Fuel Reward program (also known as holdback credit revenue). Because the utilities are required to spend a significant portion of this holdback revenue on transportation electrification projects in disadvantaged communities or for low-income individuals, the support for TNC drivers to purchase a used EV could be significant under such a hypothetical program.
4. **Partner with Utilities on Other DAC/LIC Programs:** As an alternative to the suggested used EV rebate program outlined above, TNCs can also partner with utilities to develop other projects to support ride hailing programs for disadvantaged or for low-income individuals. This is explicitly called out in the LCFS regulation as an eligible project type for meeting the utility holdback revenue equity spending requirements.



## **B. TNC Riders**

The proposed regulation encourages expanding and increasing shared ride services, as this helps TNCs achieve lower VMT relative to PMT and meet GHG reduction targets. Shared rides are priced lower and are more economical for the riders. Increasing this option and expanding its use would be economically beneficial for riders who need the savings the most.

## **IX. Standardized Regulatory Impact Analysis**

A Standardized Regulatory Impact Analysis (SRIA) was developed for this proposed regulation and released on August 6, 2020, after submission to the Department of Finance. The proposed regulation and cost assumptions have been updated since the SRIA was submitted to the Department of Finance. The cost model presented in the SRIA remains the same, but some assumptions to the cost model were modified after receiving stakeholder comments. This chapter provides the updated assumptions and the economic and health impacts of the revised targets. CARB staff modeled costs associated with meeting the GHG targets, because it is the more stringent of the two targets, and evaluated compliance at 100 percent eVMT by 2030. As explained in the SRIA, estimating the cost of the electrification compliance strategy is possible given available data for the analysis, as compared to a lack of information to conduct a cost assessment on pooling or deadhead mile reduction strategies.

### **A. Changes Since the Release of SRIA**

This section reflects the updated assumptions and targets, and not those used in the SRIA. For more details about cost input assumptions for the SRIA, see Appendix C. The changes for the cost model inputs and their associated assumptions are summarized as follows:

1. *Updated gasoline fuel price inputs.* Gasoline fuel prices were updated to reflect the 2020 California Energy Demand Forecast Update.<sup>118</sup> The forecast gasoline fuel prices are approximately 15 to 20 percent lower than the 2019 Integrated Energy Policy Report, which was used in the SRIA. As a result, the operational cost savings of any one vehicle switching to a ZEV may be slightly lower than what was estimated in the SRIA.

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<sup>118</sup> California Energy Commission. Demand Analysis Working Group (DAWG) Meeting: California Energy Demand Forecast Update Results, 2020-2031.

2. *Percentages of DC fast charger and Level 2 charger usage.* In the SRIA, the 2018 assumed ratio of DC fast charging to Level 2 home charging was assumed to be 50 percent and 50 percent, respectively, and transitioned to 90 percent DC fast charging and 10 percent Level 2 home charging for most years of the analysis.<sup>119</sup> Stakeholder feedback indicated that this assumption was overly conservative in the later years of the analysis given the likelihood that many TNC drivers will have access to home charging. Commenters noted it was also inconsistent given that the cost analysis assumes that all vehicles that switch to a ZEV will incur costs of purchasing a Level 2 home charger. In response to the stakeholder feedback, this updated analysis assumes the ratio of DC fast charging to Level 2 home charging is fixed at 50/50 for 2018 and all subsequent years of the analysis. The effect of the modified assumption is a decrease in the per-kilowatt-hour electricity price by approximately 14 percent in 2023 and 20 percent in 2030. The Level 2 public charging assumption has not changed from 0 percent in all years.
3. *Costs for Level 2 home chargers.* The annualized costs incurred for a Level 2 home charger has been revised. In the SRIA, the Level 2 home charger cost was amortized over a 3-year period at 5 percent interest. In this analysis, the Level 2 home charger costs were instead annualized over a 7-year period. This was in response to stakeholder comments that chargers last approximately 7 years before they become obsolete or need replacing. Thus the costs should be amortized over a 7-year period instead of a more capially intensive, shorter time span.
4. *ZEV barrier costs as a proxy.* TNC drivers that switch to ZEVs are assumed to incur additional costs that are linked to charging time, uncertainty in driving range, and other barriers to operating ZEVs for TNC service. In the SRIA these barrier values were assumed to be \$35 a week in 2020 and decreased to \$10 a week in 2030. Stakeholder comment suggests \$35 per week is the lower bound and these costs could be as high as \$50 per week in 2020. In response, the ZEV barrier costs have been adjusted to decrease linearly from the maximum of \$50 a week in 2020 to \$0 a week in 2030. The reduction in costs for the later years reflect the lowering of ZEV barriers due to the proliferation of ZEVs and charging infrastructure both at home and at public locations, the increased charging speeds vehicles will be able to accommodate, and the longer range of future ZEVs. The reduction in cost can also be attributed to the commitments by both Lyft and Uber to electrify their fleets in the same time frame.

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<sup>119</sup> Kurani, *State of Electric Vehicle Markets*.

5. *Adjustments to the order in which vehicles are switched over to ZEVs to comply with the electrification and GHG targets.* In the SRIA, costs for compliance were estimated with vehicles in the forecasted TNC fleet switching to ZEVs in order of net cost until the GHG targets in each year were met, regardless of the number of miles these vehicles provided for TNC service. In the latter years of the assessment, when newer model year ZEVs are anticipated to be cheaper than similar conventional gasoline vehicles, this resulted in switching many very low-mileage vehicles to ZEVs, even though they would not significantly contribute to the TNC's eVMT.

CARB staff believe that the more likely compliance strategy would be for TNCs to focus efforts on electrification of vehicles that operate many miles on the TNC platform. To adjust for this, the order in which vehicles are switched over to ZEVs was adjusted so that vehicles that have VMT greater than 3,000 in TNC service are switched first (in order of cost effectiveness). 3,000 miles was chosen because it approximates the median annual mileage of a vehicle in active 2018 TNC service. If the GHG targets were not met after all the vehicles with greater than 3,000 miles of TNC service are converted to ZEVs, then additional vehicles were switched based on the metric of net costs divided by total TNC fleet mileage. This mimics a compliance strategy where the TNC more broadly subsidizes drivers with cost savings from elsewhere in the fleet.

6. *Correction: Avoided Social Cost of Carbon (SC-CO<sub>2</sub>).* Table 12 of the SRIA incorrectly reports avoided SC-CO<sub>2</sub> in units of millions of 2007 dollars, instead of millions of 2018 dollars as described. When converted to 2018 dollars, the avoided SC-CO<sub>2</sub> is approximately 25 percent greater.
7. *Electrification and GHG targets.* Since the SRIA, the proposed regulation was modified to have more stringent GHG and electrification targets. The more stringent targets are a result of the cost model input changes described above, which informed the eVMT compliance feasibility for both the eVMT and GHG targets. A gap was retained between the emission impacts of both targets to ensure the program could promote additional mechanisms to reduce GHG emissions beyond electrification. As costs are more accurately adjusted down, allowable targets while still affording savings were adjusted upwards. In particular, since the SRIA, Lyft and Uber announced they are targeting 100 percent electrification by 2030 on their own in most of their urban

markets.<sup>120,121</sup> Lyft argued that the SRIA targets were too low and were not taking advantage of the potential benefits of higher electrification targets, but did request a slower ramp up in the early years of the regulation (original SRIA targets are more linear) with a steeper climb at the end of the regulation. The revised targets reflect these comments.

Table 19. Changes to the GHG and electrification targets since the SRIA

<b>Compliance Year</b>	<b>SRIA gCO<sub>2</sub>/PMT</b>	<b>Proposed gCO<sub>2</sub>/PMT</b>	<b>SRIA eVMT</b>	<b>Proposed eVMT</b>
2023	255	252	2%	2%
2024	240	237	4%	4%
2025	222	207	8%	13%
2026	193	161	18%	30%
2027	168	110	27%	50%
2028	140	69	38%	65%
2029	116	30	48%	80%
2030+	88	0	60%	90%

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<sup>120</sup> Lyft, 2020. "The Path to Zero Emissions: 100% Electric Vehicles by 2030." (<https://lyft-impact-assets.s3.amazonaws.com/images/path-to-zero-emissions.pdf>, accessed June 20, 2020).

<sup>121</sup> Uber, 2020. "Driving a Green Recovery." (<https://www.uber.com/newsroom/driving-a-green-recovery/>, accessed September 14, 2020).

## **B. Statewide Economic Impacts**

Statewide economic impacts are summarized below. Detailed information, supporting figures and tables are included in the SRIA document provided in Appendix C.

### ***The creation or elimination of jobs within the State of California***

The impact of the proposed regulation on total employment in California across all industries is presented in Table 20. The methods to estimate the total employment impacts are described in the SRIA and have been revised with updated cost estimates and annual targets as described above. As discussed in the SRIA, there is uncertainty as to how costs and savings will be distributed across TNCs, drivers, and riders. For the macroeconomic modeling, CARB staff make the conservative assumption that in addition to reporting costs, all upfront positive costs for ZEVs and costs for home chargers will also be borne by the TNC companies in the form of increased production costs to the transit and ground passenger transportation industry. Cost savings are assumed to incur to the TNC drivers and are modeled as increases in proprietors' income in the transit and ground passenger transportation industry.

The proposed regulation is estimated to result in a slight negative job impacts in all years of the assessment. Industries that are estimated to have net costs, decreases in demand, or revenue loss such as petroleum and coal product manufacturing, transit and ground passenger transportation industry, automotive repair, and state and local government are estimated to see decreases in employment growth. These changes in employment represent less than 0.01 percent of BAU California employment. Based on the major sector breakdown of job impacts in 2031, the proposed regulation is estimated to result in 1,454 job gains and 4,738 job losses for a net impact of approximately 3,285 job losses.

Table 20. Total California employment impacts\*

Year	2021	2023	2025	2027	2029	2031
California Employment (Millions)	21.06	22.60	23.78	24.73	24.75	24.76
Percent Change	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%
Change in Total Jobs	-1	-44	-60	-252	-1,054	-3,285
Natural Resources	0	0	2	5	8	10
Construction	0	4	60	268	431	576
Manufacturing	0	1	9	35	55	75
Retail and Wholesale	0	6	37	145	242	370
Transportation and Public Utilities	0	-50	-163	-743	-1,895	-4,536
Finance, Insurance & Real Estate	0	2	20	73	107	129
Services	0	0	3	39	114	295
Government	0	-8	-28	-74	-117	-203

\* Totals may not sum due to rounding

***The creation of new business or the elimination of existing businesses within the State of California***

The proposed regulation is not anticipated to directly result in new business creation or elimination. Neither of the two companies that are directly impacted are anticipated to be eliminated as a result of the proposed regulation. While changes in jobs for the California economy cannot directly estimate the broader impacts on business creation and elimination, they can be used to understand some of the potential impacts to businesses. The overall job impacts of the proposed regulation are very small relative to the total California economy, representing changes of less than 0.01 percent.

***The expansion of businesses currently operating within the State of California***

**Electric Vehicle Service Providers, Related EVSE Suppliers, and Businesses Adjacent to Public Charging**

The proposed regulation will increase the total amount of eVMT in the state, which in turn could increase use of charging stations across the State and lead to increased

revenue for businesses that provide EV charging services, hardware, software, and installation. TNC drivers currently account for up to 35 percent of use at DC fast chargers, making the business model for private investment more stable and predictable (than without TNC users).<sup>122,123</sup> If charger use were to increase from higher TNC eVMT, the business model would be further strengthened.

Increased use of public charging stations may also have benefits to businesses near charging stations. Many charging stations are located in areas with available shopping, restaurants, or other services such as dry cleaning. Commercial businesses that provide services that TNC drivers may want to make use of may benefit from the presence of the chargers nearby.

### Electricity Utility Providers

The increased use of chargers as described above in turn will increase the amount of electricity supplied by utility providers. Currently, the charging of ZEVs represents the single largest growth area for electric utility companies as traditional areas of growth have been reduced by energy conservation efforts.

The proposed regulation also helps the state's investor-owned utilities meet the goals of SB 350, the Clean Energy and Pollution Reduction Act of 2015. SB 350 requires the state's investor-owned utilities to develop programs to accelerate widespread transportation electrification with goals to reduce dependence on petroleum, increase the uptake of ZEVs, help meet air quality standards, and reduce greenhouse gas emissions. As noted earlier, Southern California Edison and San Diego Gas & Electric have both proposed programs that are awaiting CPUC decision as extensions of earlier light-duty EV infrastructure pilots. Pacific Gas & Electric has been approved for a DC fast charging make-ready program, and the three smaller investor-owned utilities have also been approved for light-duty EV infrastructure programs. Furthermore, all three large investor-owned utilities have either proposed or have been approved to establish new electricity rates for commercial ZEV infrastructure use cases. By ensuring additional eVMT will be available to make use of these utility investments and rates, the proposed regulation supports the utilities' programs and the goals of SB 350.

### Car Rental and Dealership Benefits

The proposed regulation may result in benefits to the used ZEV market as TNC drivers seek to gain access to the longer-range but lower-cost used ZEVs that have leases ending from the first owners. Dealerships and other businesses involved in the sale of

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<sup>122</sup> CPUC, *Electrifying the Ride Sourcing Sector*.

<sup>123</sup> Jones, *The Future of Transportation Electrification*.

used vehicles may benefit. To the extent that this regulation increases the demand for used ZEVs, a benefit to overall ZEV residual values could occur. Specifically, costs of new vehicles are traditionally off-set by the residual values of used vehicles particularly for commercial purchases such as for rental companies or other commercial fleets. Currently, used ZEV values are lower than their ICE vehicle counterparts, Tesla vehicles excepting.<sup>124</sup> If the regulation increases demand for used ZEVs, the residual values will improve, and then the economics for purchasing new ZEVs also improves. This could help mitigate a key barrier to ZEV investments for private companies.<sup>125,126,127</sup> In particular, vehicle rental companies would benefit directly from these improved ZEV residual values.

***The competitive advantages or disadvantages for businesses currently doing business within the state***

At this time, the competitive advantages or disadvantages created by the proposed regulation between Uber and Lyft do not appear to be material. Both companies' drivers exhibit similar vehicle types, average passenger miles per trip, and exist in similar markets. The economics of one of these companies meeting GHG and electrification targets appear to be very much the same as the other.

The proposed regulation does not present any overt or direct advantages. Both of the proposed targets have relative metrics and are specifically designed to be independent of the size of a company's market share or cash flow. The GHG target metric is on a per passenger-mile basis, and the electrification target is in percent eVMT, both of which are relative to the number of miles provided by a given TNC. In this way, the proposed regulation is designed to mitigate any competitive advantage or disadvantage to any particular TNC as a result of its relative size in the market.

The proposed regulation may provide a competitive advantage to TNC drivers that already have ZEVs or more fuel-efficient vehicles than other drivers. All else being equal, TNCs could potentially favor more efficient vehicles when matching passengers to drivers, as miles traveled in these vehicles could increase eVMT and have lower GHG emissions per passenger mile.

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<sup>124</sup> [https://www.greencarreports.com/news/1123583\\_beyond-tesla-electric-cars-lose-value-faster-than-other-vehicles](https://www.greencarreports.com/news/1123583_beyond-tesla-electric-cars-lose-value-faster-than-other-vehicles), accessed June 24, 2020.

<sup>125</sup> Levay, Drossinos, and Thiel. 2017. The effect of Fiscal incentives on market penetration of electric vehicles: a pairwise comparison of total cost of ownership. *Energy Policy*, Vol. 105, pp 525-533.

<sup>126</sup> Seattle Office of Sustainability & Environment. 2014. Removing Barriers to Electric Vehicle Adoption by Increasing Access to Charging Infrastructure.

<sup>127</sup> Coffman, Bernstein, and Wee. 2015. Factors Affecting EV Adoption.



The proposed regulation may also provide a disadvantage to California drivers near the state border. For example, a TNC driver in Nevada could potentially be chosen over a California driver to respond to a ride request that occurred near the border as some of the miles from the driver located on the Nevada side of the border would not be counted toward the TNC’s GHG emissions.

***The increase or decrease of investment in the state***

Private domestic investment consists of purchases of residential and nonresidential structures and of equipment and software by private businesses and nonprofit institutions. It can be used as a proxy for impacts on investment in California because it provides an indicator of the future productive capacity of the economy. The relative changes to growth in private investment for the proposed regulation are shown in Table 21. An increase of private investment of \$173 million is expected by 2031, amounting to approximately 0.04 percent of baseline investment. Increases in private investment are largely driven by the impact of net savings of the Proposed Regulation, whereby cost savings to TNC drivers increases discretionary spending in the broader economy.

Table 21. Change in gross domestic private investment

Year	2021	2023	2025	2027	2029	2031
California Gross Domestic Private Investment (Million 2018\$)	323,535	365,614	423,703	468,454	482,435	494,940
Percent Change	0.00%	0.00%	0.00%	0.02%	0.03%	0.04%
Change in Million 2018\$	0	2	18	78	129	173

***The incentives for innovation in products, materials, or processes***

As part of the proposed regulation, TNC and supporting rental companies have several opportunities to innovate. Over the past several years, there were a small number of rental companies that supplied BEVs or FCEVs for TNC drivers to rent. Typically, these companies offer vehicles on a weekly basis and charging is included. Most drivers who rent vehicles drive more to earn enough income driving for TNCs in order to cover the rental fees. We expect these rental programs to re-emerge and grow as the price of ZEVs goes down and the proposed regulation will further support these businesses. This part of the market has not yet been developed due, presumably, to the low demand for such services and the expense of transaction logistics. Were these types of new hourly rental services to develop, as a result of the proposed regulation, this would assist low- to moderate-income drivers in accessing ZEVs for TNC services with no capital required. Since the vast majority of TNC drivers

are part-time, this innovation would provide ZEV access to a much larger segment of TNC drivers.

General Motors' Maven Gig program offered rentals of ZEVs for ride-hail and delivery driving. Maven's partnership with EVgo provided a number of dedicated fast-charging locations for exclusive use by Maven Gig drivers. Other car-sharing companies, including Envoy and Gig, have offered reduced rental rates for ZEVs for use in ride-hailing services. These partnerships and programs continue to evolve through this uncertain time.

For TNC companies themselves, the GHG targets are designed for innovation in myriad ways, such as reducing deadhead miles, increasing pooling or occupancy, developing partnerships with transit, and investing in active transportation and other forms of increased system efficiency.

To reduce deadhead miles, TNCs could innovate in a number of ways such as incentivizing drivers to park while waiting for a ride match as opposed to driving around the city. This may necessitate agreements with local jurisdictions, retail properties, or privately operated parking lots to designate temporary parking and possibly charge their ZEVs. TNCs should optimize algorithms to guide drivers during Period 1 to where the next fare is most likely to be, thus shortening both Period 1 and Period 2 miles. A simulation study found that this technique could reduce empty miles traveled by approximately 50 to 80 percent.<sup>128</sup>

The GHG target of the proposed regulation is designed to encourage the increase of PMT relative to VMT. Shared rides, or pooling, is a key strategy to achieve this. Prior to the COVID-19 pandemic, pooling was only offered in three California markets where there is enough demand – San Francisco, Los Angeles, and San Diego. Currently, TNCs raise prices during periods of high demand such as when it suddenly rains, when a sporting event ends, during commute hours to downtown, or when a transit train suddenly discharges hundreds of passengers at a station all at the same time. This is known as "peak pricing." These situations are the exact same situations where pooling could be offered temporarily as there are many potential passengers or fares who are either starting at the same location (sporting event ending or transit stop passengers all exiting at the same time) or ending at the same location (commute hours going downtown, or to a sporting event or a transit stop). However, a TNC is currently not motivated to offer temporary pooling at these times and the peak pricing offers the best profit for TNCs and their drivers. The proposed regulation could

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<sup>128</sup> Kontou, Eleftheria, Venu Garikapati, and Yi Hou. "Reducing ridesourcing empty vehicle travel with future travel demand prediction." *Transportation Research Part C: Emerging Technologies* 121 (2020): 102826.

motivate TNCs to forgo some of the profits for reductions in GHG emissions per passenger mile.

Incentives in the form of regulatory credits could lead to innovations in partnerships with transit agencies. Partnerships with transit could make the transportation system more efficient, more accessible, as well as bolster transit use. These opportunities are particularly beneficial in city centers with one-way streets or wide roadways where a driver may have to circle blocks in heavy traffic to get to the passenger.

Innovations in system-wide efficiencies are encouraged by the proposed regulation. TNC driver-rider matching, currently is optimized primarily to minimize travel times and wait times. Offering passengers an option to walk a block or two to meet a TNC ride instead of being picked up at their request location can allow a TNC driver to use a more direct route (deviate less), particularly for pooled trips with multiple pick-up and drop-offs. With the proposed regulation, additional factors may be considered, such as GHG emissions, use of more ZEVs, and occupancy increases. Additional possibilities include more optimal trip routing that balances energy consumption reduction with travel time minimization.

### **C. Benefits of the Regulation to the Health and Welfare of California Residents, Worker Safety, and the State's Environment**

The proposed regulation will benefit individual California residents mainly by reducing adverse health impacts caused by criteria emissions such as NO<sub>x</sub> and PM. The reduction of GHG emissions helps combat climate change and its destructive environmental effects felt by California residents. If TNCs comply with the GHG targets in part through VMT reduction, this could also benefit California individuals by reducing congestion on California roads. The cumulative NO<sub>x</sub>, PM<sub>2.5</sub>, and GHG emission reductions under the proposed regulation are illustrated in Figure 3 through Figure 5. The annual emission reductions of the proposed regulation are summarized in Table 22.

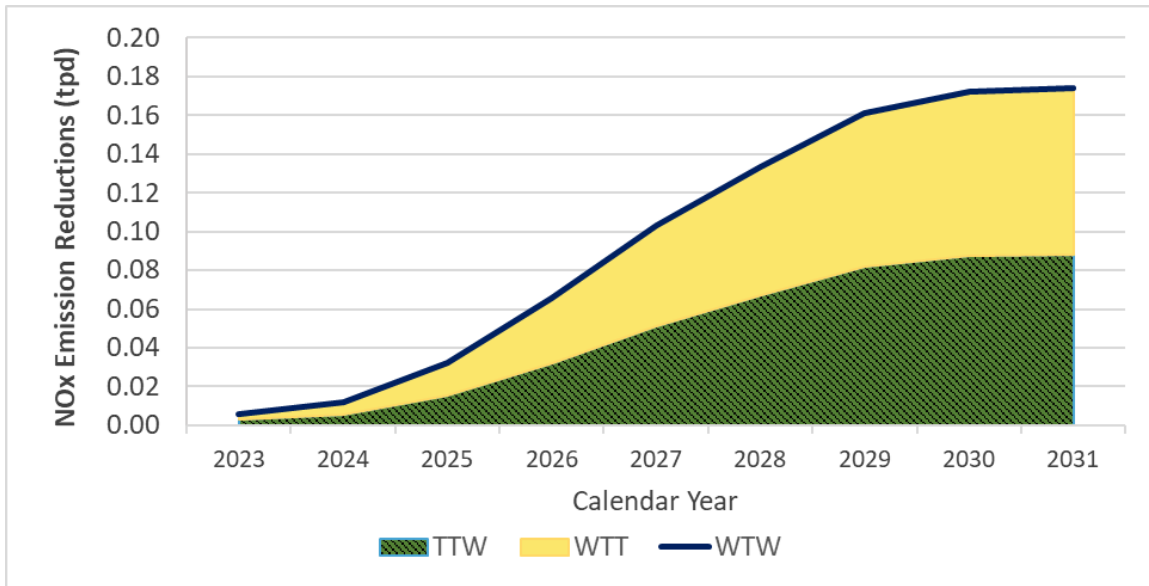


Figure 3. Estimated NOx reductions under the proposed regulation for tank-to-wheel (TTW), well-to-tank (WTT), and well-to-wheel (WTW) emissions

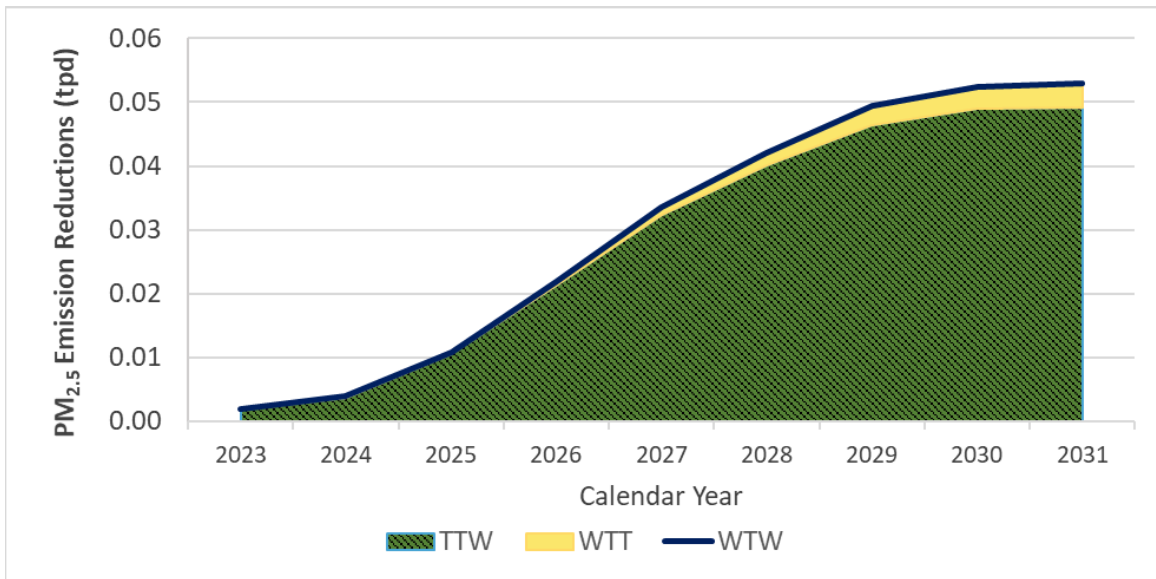


Figure 4. Estimated PM2.5 emission reductions under the proposed regulation

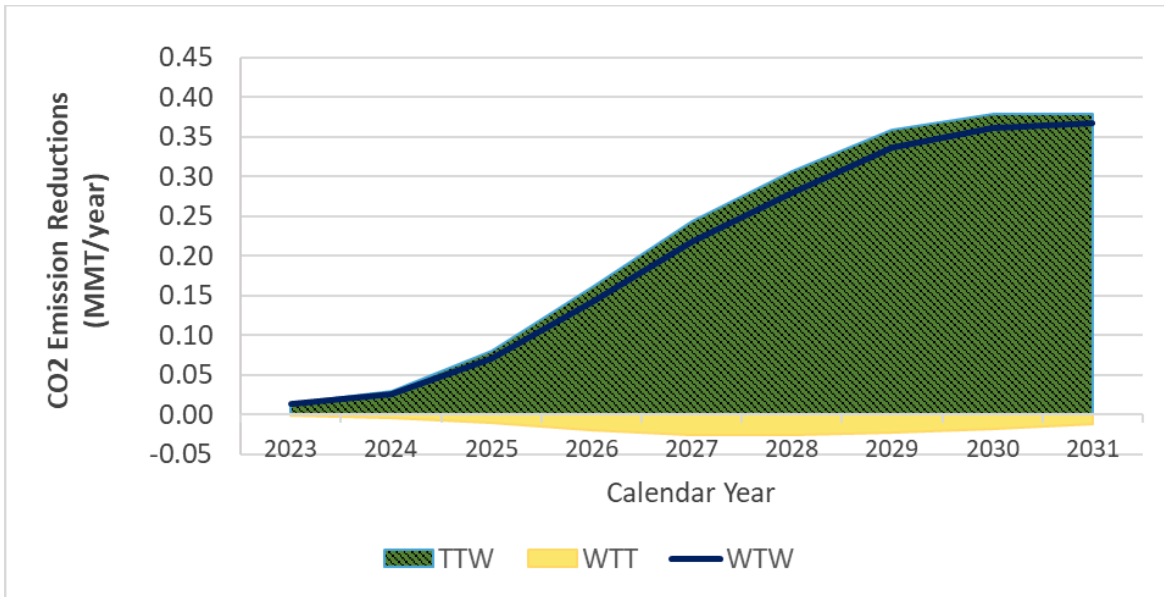


Figure 5. Estimated CO<sub>2</sub> emission reductions under the proposed regulation

Table 22. Projected annual and total NO<sub>x</sub>, PM<sub>2.5</sub>, and CO<sub>2</sub> emission reductions from the proposed regulation

Year	PM <sub>2.5</sub> (tons)	NO <sub>x</sub> (tons)	GHG (MMT)
2023	0.65	2.12	0.01
2024	1.35	4.08	0.03
2025	3.75	11.14	0.07
2026	7.57	22.78	0.14
2027	11.61	35.78	0.22
2028	14.59	46.25	0.28
2029	17.13	55.94	0.34
2030	18.18	59.65	0.36
2031	18.39	60.30	0.37
<b>Total</b>	<b>93.21</b>	<b>298.03</b>	<b>1.81</b>

## X. Evaluation of Regulatory Alternatives

Government Code section 11346.2, paragraph (4) of subdivision (b) requires CARB to consider and evaluate reasonable alternatives to the proposed regulatory action and provide reasons for rejecting those alternatives. This section discusses alternatives evaluated and provides reasons why these alternatives were not included in the

proposal. As explained below, no alternative proposed was found to be less burdensome and equally effective in achieving the purposes of the regulation in a manner than ensures full compliance with the authorizing law. The Board has not identified any reasonable alternatives that would lessen any adverse impact on small business.

**A. Alternative 1 – 100 Percent eVMT by 2030**

This first alternative is the case where TNCs achieve 100 percent eVMT by 2030 and with higher targets in the early compliance years. CARB staff used the cost model to track a trajectory across the period of the regulation where costs are optimized for a 100 percent eVMT target in 2030 (see Table 23). This alternative was developed based on direction from the Board in the January 2020 Board Hearing as well as stakeholder input.

Table 23. Alternative 1 of 100% eVMT by 2030 and with higher intermediate targets

Calendar Year	Alternative 1 eVMT Targets
2023	5%
2024	15%
2025	30%
2026	60%
2027	70%
2028	80%
2029	90%
2030	100%

Alternative 1 would increase the number of ZEVs used in TNC service relative to the proposed regulation in every year between 2023 and 2029. Table 24 shows the number of vehicles that must switch to ZEVs for each year of the regulation for the Alternative 1 scenario compared to the compliance scenario of the proposed regulation. This alternative would also result in higher costs. Costs to the TNC industry for vehicle purchases, home chargers, and electricity would increase, but drivers may also realize cost savings associated with less gasoline use and decreased vehicle maintenance.

Table 24. Number of vehicles switched to ZEV for Alternative 1 compared to proposed regulation with associated costs borne by TNC industry (in millions)

Year	Alternative 1	Net Costs (Savings) for Alt 1	Proposed Regulation	Net Costs (Savings) for Proposed Regulation
2023	3,835	6.37	1,503	1.77
2024	23,395	16.60	6,783	0.49
2025	62,864	17.78	28,904	(3.52)
2026	163,068	29.59	82,562	(30.11)
2027	211,596	(30.7)	155,523	(67.24)
2028	266,048	(105.44)	228,758	(130.39)
2029	332,308	(171.59)	316,623	(187.82)
2030	751,024	(213.96)	751,024	(213.96)

Figure 6 illustrates the annual net cost to TNCs and drivers for Alternative 1 in 2018 dollars. Costs include reporting, electricity, home charger, gasoline, vehicle purchase, maintenance, and ZEV barriers.

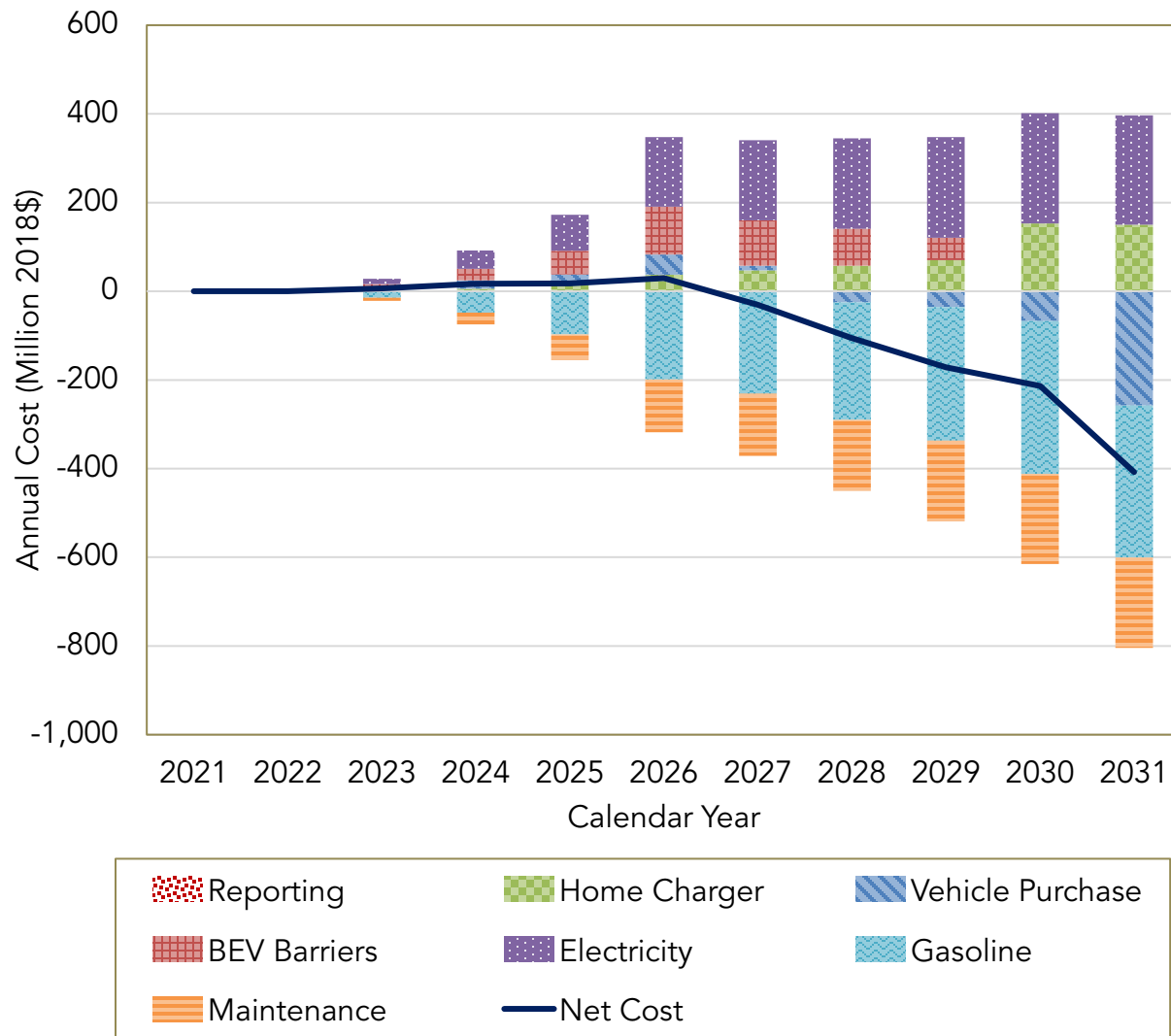


Figure 6. Annual cost for Alternative 1 for TNCs and TNC drivers

In June 2020, Lyft announced a company goal of achieving 100 percent electric vehicles in their fleet by 2030.<sup>129,130</sup> Similarly, Uber has announced a goal to achieve 100 percent electrification in major markets in the U.S., Canada and Europe by 2030 and having a full zero-emission platform by 2040.<sup>131</sup> These announcements are independent of the proposed regulation. Although these companies have made public commitments for all ZEV operations, they also acknowledge that barriers to

<sup>129</sup> Lyft, *Leading the transition to zero-emissions*.

<sup>130</sup> Lyft, *Path to Zero Emissions*.

<sup>131</sup> Uber, *Driving a Green Recovery*.



electrification still remain and that government policy actions, as well as industry and non-profit support, are needed in achieving the transition to 100 percent eVMT. Particularly in consideration of the large portion of drivers who are from low-income households, a 100 percent eVMT target by 2030 may put additional burden on the lowest income drivers.

Alternative 1 is more stringent than the proposed regulation as it would require all vehicles in TNC service to electrify by 2030. Alternative 1 could provide more PM<sub>2.5</sub>, NO<sub>x</sub>, and GHG emission reductions and health benefits, but results in lower net cost savings to the TNC industry.

Alternative 1 is rejected because CARB cannot ensure that a 100 percent electrification target and higher targets in the earlier years could be achieved without significant impacts to some TNC drivers, particularly those with lower household incomes and those that have a short tenure or fewer miles in TNC service. Although there are business models supported by TNCs that provide short-term electric vehicle rentals, these services are not currently operating in California. Further, lower income drivers commonly drive older vehicles and would not be able to take advantage of the cost parity of electric and conventional vehicles closer to 2030. Additionally, requiring 100 percent electrification would not provide an opportunity for TNCs to comply with other actions, such as pooling, deadhead mile reduction, and connections to transit, all of which are goals stated in SB 1014 and the SB 375 Progress Report.

SB 1014 provides clear direction to the CPUC to carefully consider impacts to lower income drivers, and allows the CPUC to delay implementation of the regulation if barriers to low-income drivers gaining access to electric vehicles persist. Several factors that CARB staff have assessed, but cannot be assured, include the rate of infrastructure investment and buildup, continued funding for vehicle incentive programs, as well as reductions over time in electricity rates for vehicle charging.

## **B. Alternative 2 – 80 Percent eVMT by 2030**

In the second alternative, the percent eVMT target is set to 80 percent by 2030 (Table 25). Alternative 2 would increase the number of ZEVs in TNC service relative to the BAU scenario, but would require fewer ZEVs than the proposed regulation. This would result in lower costs associated with vehicle purchase, home chargers, and electricity, but would also decrease the amount of savings associated with gasoline fuel and vehicle maintenance.

Table 25. Alternative 2 scenario of 80% eVMT by 2030

Calendar Year	Alternative 2 eVMT Targets
2023	2%
2024	4%
2025	15%
2026	30%
2027	45%
2028	60%
2029	75%
2030	80%

Figure 7 illustrates the costs for Alternative 2 for TNCs and TNC drivers. Under Alternative 2, TNCs and TNC drivers would see net cost savings in most years of the assessment as the savings associated with gasoline and maintenance outweigh additional costs associated with electricity, home chargers, and the BEV barriers. In 2030, Alternative 2 is estimated to provide net cost savings of approximately \$310 million that could be spread between TNCs and TNC drivers.

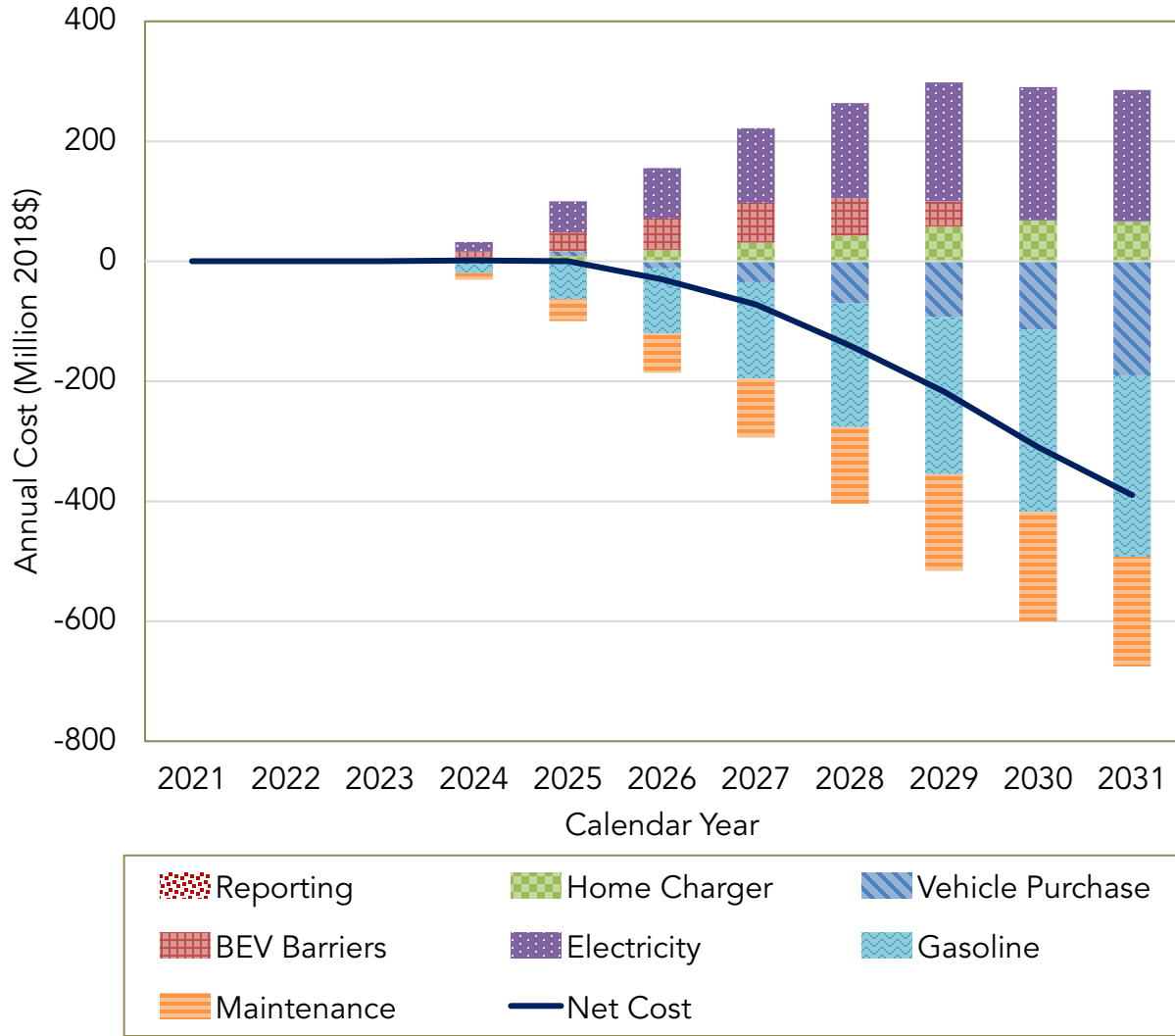


Figure 7. Annual Cost for Alternative 2 for TNCs and TNC drivers

For comparison, the costs for the proposed regulation, which uses an eVMT of 100 percent to meet the GHG target, are shown in Figure 8. Similar to the figure above, the proposed regulation is anticipated to result in net cost savings in most years of the assessment due to cost savings associated with reduced gasoline use and maintenance. Relative to Alternative 2, the proposed regulation is more stringent, requiring more vehicles to be switched to ZEVs and resulting in greater electricity, BEV barrier, and home charger costs, relative to the Alternative 2. Over the lifetime of the assessment, the proposed regulation is estimated to provide fewer net benefits to TNCs and TNC drivers. In 2030, the proposed regulation is estimated to provide net benefits of approximately \$215 million that could be spread among TNCs and TNC drivers.

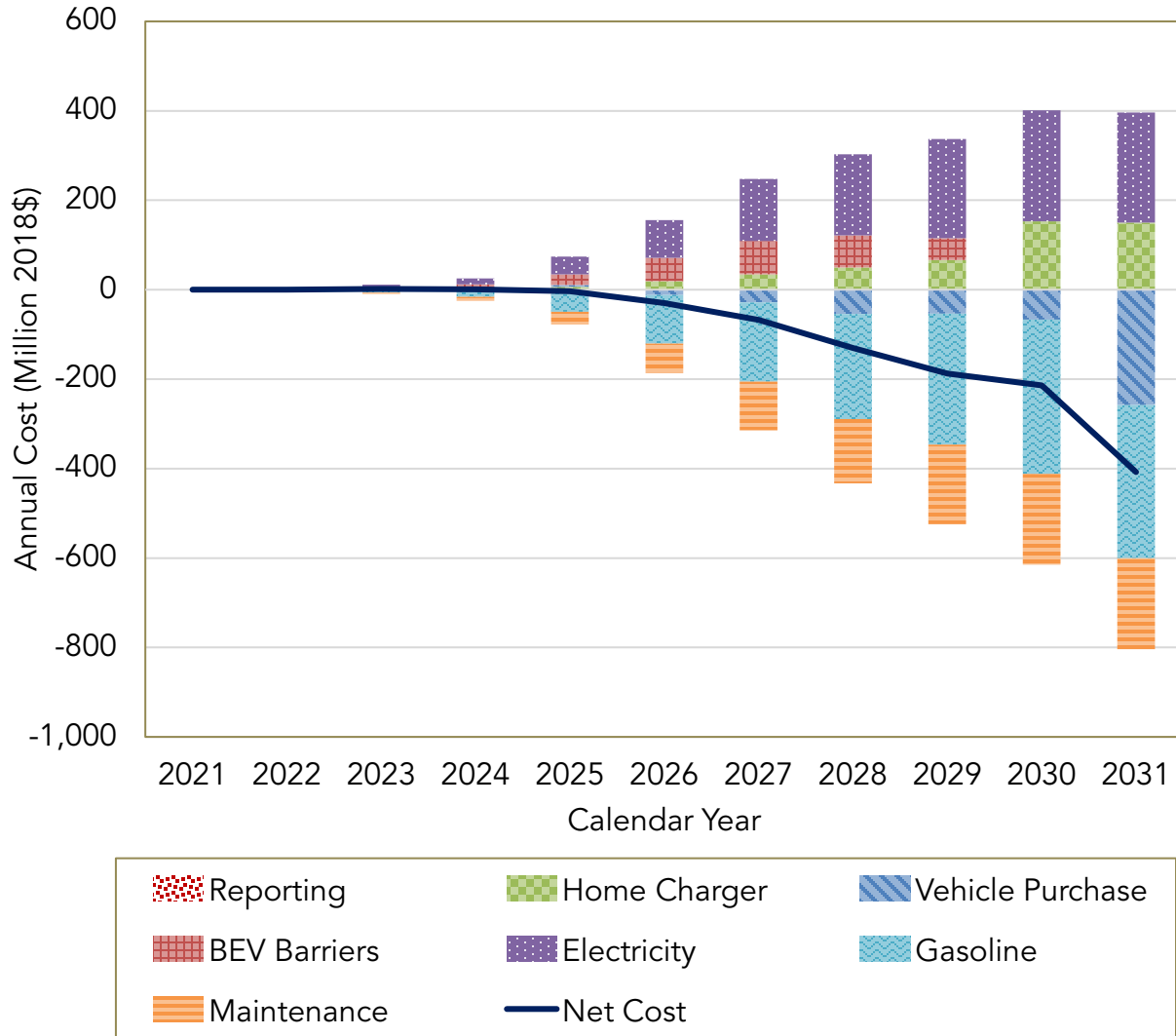


Figure 8. Annual cost for TNCs and TNC drivers from the proposed regulation

Alternative 2 is rejected because it does not make use of the opportunities presented for this regulation. Given that Lyft has committed to achieving a 100 percent electrification by 2030 – and Uber has announced similar commitment – the Alternative 2 scenario would be ineffective in pushing the industry to innovate.

### C. GHG Impacts from Alternatives

Both Alternatives 1 and 2 will achieve significant GHG reductions by 2030. Alternative 1 would achieve 0 g CO<sub>2</sub>/PMT by 2030 with full electrification of the TNC fleet and Alternative 2 would achieve 47 g CO<sub>2</sub>/PMT. Figure 9 illustrates this point. While proposed regulation’s eVMT target alone would achieve 24 g CO<sub>2</sub>/PMT by 2030, the GHG target is set at 0 g CO<sub>2</sub>/PMT.

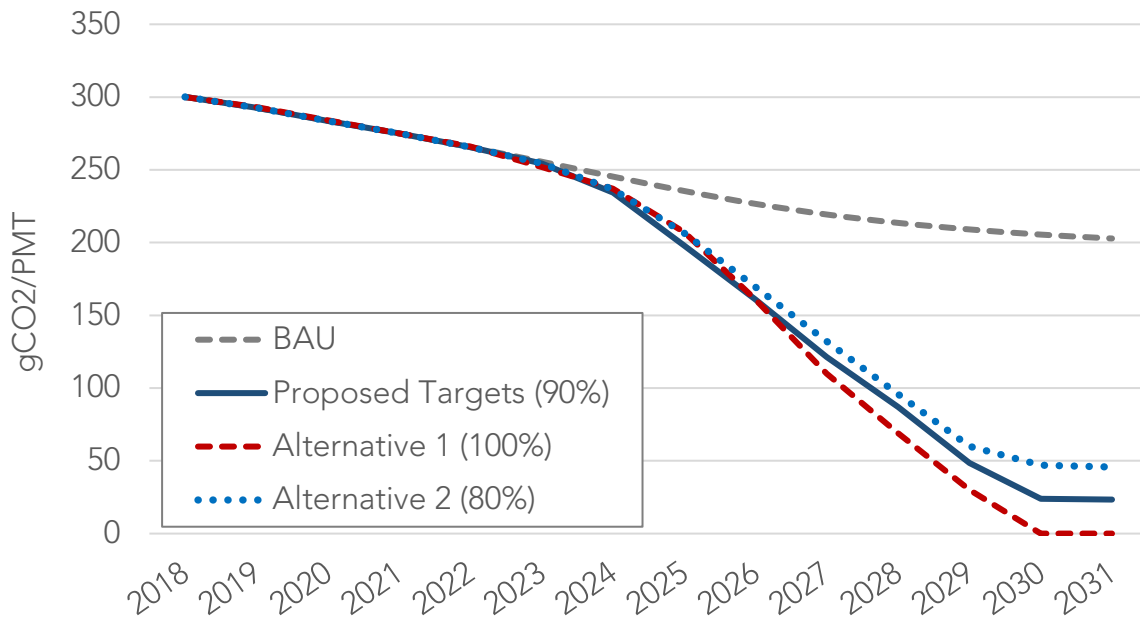


Figure 9. GHG reductions from eVMT target alternatives

**Small Business Alternative**

There is no expected adverse impact on small businesses under the proposed regulation. While there are 12 TNCs operating in California, only two of them are anticipated to remain above the 5 million annual VMT threshold which would subject them to the electrification and GHG requirements. Under the proposed regulation, small TNCs will only be required to report information that they already currently report to CPUC.

**Performance Standards in Place of Prescriptive Standards**

The proposed regulation includes both performance standards (GHG targets) and prescriptive standards (electrification targets). Having only performance standards of annual GHG targets would result in a larger mix of compliance actions that may not achieve a high level of electrification in the TNC fleet. The proposed regulation requires a minimum level of electrification, which is achieved by compliance with the annual eVMT targets, as required by SB 1014. The remaining GHG reduction can be achieved with a combination of electrification and other strategies that include pooling, deadhead mile reduction, more fuel-efficient vehicles, investment in infrastructure that supports active transportation, and enabling connections to transit through integrated fare payment. By having GHG targets that are separate

from eVMT, each TNC can use the combination of strategies that is best suited for their business, beyond meeting the minimum electrification requirement.

### ***Health and Safety Code section 57005 Major Regulation Alternatives***

CARB estimates the proposed regulation will have an economic impact on the state's business enterprises of more than \$10 million in one or more years of implementation. CARB will evaluate alternatives submitted to CARB and consider whether there is a less costly alternative or combination of alternatives that would be equally as effective in achieving increments of environmental protection in full compliance with statutory mandates within the same amount of time as the proposed regulatory requirements, as required by Health and Safety Code section 57005.

## **XI. Justification for Adoption of Regulations Different from Federal Regulations Contained in the Code of Federal Regulations**

No current federal regulations address the same issue as CARB's proposed greenhouse gas reduction and electrification targets for TNCs.

## **XII. Public Process for Development of the Proposed Action (Pre-Regulatory Information)**

Consistent with Government Code sections 11346, subdivision (b), and 11346.45, subdivision (a), and with the Board's long-standing practice, CARB staff held public workshops and had other meetings with interested persons during the development of the proposed regulation. These informal pre-rulemaking discussions provided staff with useful information that was considered during development of the regulation that is now being proposed for formal public comment.

Throughout the development of this regulation, CARB staff sought input from stakeholders and the public through various outreach events, including public workshops, a public board hearing, stakeholder working groups, expert panel convening, as well as individual meetings with stakeholders. A complete list of public outreach and stakeholder events appears in Table 26. Copies of the notices for public workshops are included in Appendix E.

Table 26. Stakeholder and public outreach events

DATE	EVENT	OBJECTIVE
February 22, 2019	Public Workshop 1	Introduce the requirements of SB 1014 and begin regulatory development process.
May 8, 2019	Stakeholder Working Group Meeting 1	Discuss de-duplicating trip miles in the 2018 dataset.
May 15, 2019	Stakeholder Working Group Meetings 2 & 3	Solicit feedback for assumptions in base year and business-as-usual forecasting for deadheading, occupancy, fuel economy, and eVMT.
July 9, 2019	Stakeholder Working Group Meeting 4	Solicit feedback for the preliminary regulation design.
September 25, 2019	Public Workshop 2	Present the 2018 base year emissions inventory assumptions and methodology.
January 23, 2020	Public Board Hearing	Present the 2018 base year emissions inventory to Board Members and the public. The Board adopted Resolution 20-4.
March 20, 2020	Expert Panel Convening	Seek input from academic and industry experts on business-as-usual modeling, pooling strategies, electrification strategies, and other topics.
April 1, 2020	Public Workshop 3	Present the business-as-usual modeling assumptions and methodology.
May 15, 2020	Public Workshop 4 Solicitation for Alternatives	Present the eVMT target assumptions and methodology. Update on GHG target development and exemptions for small TNCs. Solicit for economic alternatives.
July 17, 2020	Public Workshop 5	Present proposed eVMT and GHG targets and regulatory credits for transit and active transportation.

DATE	EVENT	OBJECTIVE
November 19, 2020	Public Workshop 6	Present updated proposed eVMT and GHG targets, and options to earn credit by subsidizing cost of ownership or operation of a ZEV.
January 13 & 14, 2021	Driver Meetings	Present proposed targets and solicit input on credit options and drivers' EV experience and perceptions.



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## **XIV. Appendices**

Appendix A	Proposed Regulation Order
Appendix B	Base Year Inventory Report
Appendix C-1	Standardized Regulatory Impact Analysis (SRIA)
Appendix C-2	Summary and Response to Department of Finance Comments on the Standardized Regulatory Impact Assessment
Appendix D	Notices of Public Workshop