

# **The Role of Booster's Mobile Fueling on Demand (MFOD) Business Model in Supporting an Environmentally Just Energy Transition**

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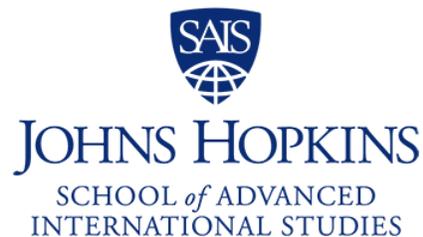
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**Project Advisor: John P. Banks**

## Acronyms

AFV	Alternative Fuel Vehicle
BEV	Battery Electric Vehicle
CARB	California Air Resources Board
CO2	Carbon Dioxide
DEF	Diesel Exhaust Fluid
DERA	Diesel Emissions Reduction Act
EIA	Energy Information Administration
EPA	Environmental Protection Agency
EV	Electric Vehicle
GHG	Greenhouse Gasses
GVWR	Gross Vehicle Weight Rating
IARC	International Agency for Research on Cancer
ICE	Internal-Combustion Engine
MFOD	Mobile Fuel on Demand
MTBE	Methyl Tertiary Butyl Ether
NACS	National Association of Convenience Stores
NOx	Nitrogen Oxides
PHEV	Plug-in Electric Vehicle
PM	Particulate Matter
RFS	Renewable Fuel Standard
SAIS	School of Advanced International Studies
SANDAG	San Diego Association of Governments
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TNC	Transportation Network Company
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds
WDES	Washington Department of Enterprise Services
ZEV	Zero-Emission Vehicle

## Executive Summary

The Mobile Fueling on Demand (**MFOD**) business model provides customers with a unique service. Fleets that employ Booster's MFOD business model are able to save money on overhead expenses, reduce vehicle miles traveled outside of planned service routes, and support a supply chain with fewer vapor emissions, reduced spillage, and no ground pollution from underground fuel storage tanks of traditional gas stations. Booster's MFOD business model allows its customers to lower their carbon footprint and support environmentally sustainable business practices. In the current market, where business and government entities are looking for business solutions that can increase profit while at the same time contributing to the energy transition, sustainability is a crucial consideration for any business decisions.

The ongoing energy transition questions and challenges traditional business approaches. Despite the existing positive environmental impacts of Booster's MFOD business model, the core of its business remains the provision of conventional fuel services: gas and diesel mobile fueling. Therefore, Booster's MFOD business model requires optimization to support the energy transition and increase its net positive impact on environmental justice.

Booster tasked the Practicum Team of the Johns Hopkins University School of Advanced International Studies (SAIS) with the following objective: *“Identify a broad strategy including specific activities, initiatives, and policies/regulations that allow Booster to leverage its MFOD business model to support a decarbonization transition, and in particular address the needs of under-served communities as part of a ‘just’ transition.”*

To identify a broad strategy for Booster in leveraging its MFOD business model to support decarbonization and environmental justice, we reviewed and analyzed regulations and policies applicable to the MFOD business model in four markets (Federal, California, Washington, and D.C./Maryland). After a robust examination of the existing regulatory environment, legislation, bills under consideration, trends, and environmental justice considerations, we identified major priorities and recommendations in policymaking, operations, and regulation for conventional and renewable fuels.

In this report (**Report**), we examined the results of our research and interviews with industry experts against an evaluation framework based on five criteria:

1. Regulatory environment
2. Technology readiness
3. Impact on the energy transition and environmental justice
4. Business readiness and profitability
5. Scalability of a solution.

As a result of our evaluation, we developed a decarbonization strategy for Booster (**Decarbonization Strategy**) with the most optimal recommendations that provide Booster with new growth opportunities, while at the same time addressing the goal of a high positive net impact on the energy transition and environmental justice.

The Decarbonization Strategy for Booster includes the following recommendations:

<b>Conventional Fuels</b>	<b>Market</b>			
Recommendations:	Federal Level	California	DC/Maryland	Washington
Fuel of cars parked during the day at mobility hubs and other public transport connecting points and metro centers	✓	✓	✓	✓
Serve paratransit, on-demand public transit and microtransit, university and school shuttles	✓	✓	✓	✓
<b>Biofuels</b>				
Support heavy duty vehicles at marine ports of entry	✓	✓		✓
Support heavy duty vehicles at land ports of entry	✓			✓
Support heavy duty vehicles at airports				✓
Refuel flex fuel vehicles owned by government entities	✓	✓		
<b>Electric Charging</b>				
Provide EV charging for multi-family dwellings		✓	✓	
Collaborate with Transportation Network Companies (TNC) to provide chargers to partner drivers		✓		
Deliver charging solutions for corporate campus and retail fueling		✓	✓	✓

The solutions included in the Decarbonization Strategy received the highest score in the Evaluation Framework and represent the most promising areas for Booster’s MFOD business model expansion. The Decarbonization Strategy can inform the future operations of Booster to increase its customer base, while providing positive outcomes for underserved communities and achieving environmental justice goals.

We identified several major challenges for Booster expansion:

- The restrictive or ambiguous regulatory environment
- Lack of uniformity in permitting and licensing of mobile fueling
- Technological limitations in electric charging

Increasing public awareness and marketing of Booster’s MFOD business model can also increase Booster’s customer base and net positive impact on the energy transition and environmental justice.

Detailed analysis of the above matters is provided further in this Report.

# 1. Introduction and Project Objectives

The transportation sector is an integral part of the economy, but so is decarbonization and the new realities of doing business under climate change directives and just transition initiatives. Today, the transportation sector accounts for almost a quarter of global CO2 emissions, and over 72 percent of global transport emissions come from road vehicles.<sup>i</sup> These impacts are massive in terms of money and health.

Criteria air pollutants, including nitrogen oxides (NOx), volatile organic compounds (VOC), and particulate matter (PM), are location-specific and negatively impact the health of those exposed due to geographic proximity. Global costs of transportation-attributable health impacts reached \$1 trillion in 2015.<sup>ii</sup> The U.S. contributes 1,728 megatons of CO2 equivalent annually, more than any other economy, making changes in the transportation sector a priority for the entire population.<sup>iii</sup>

Negative externalities caused by the transportation sector impact society in highly inequitable ways, disproportionately affecting lower-income households and minority populations. The EPA Center for Air, Climate, and Energy Solutions concludes that African Americans, Hispanics, Asians, and other people of color are disproportionately exposed to PM.<sup>iv</sup> Moreover, African American populations are 75 percent more likely to live in fence-line communities, which are defined as areas near commercial facilities that produce odor, traffic, or emissions (and can include gas stations) than white populations.<sup>v</sup> Such exposure causes a detrimental impact on health, including increased risks of heart attack, asthma, congenital disabilities, and many others. Similar links to adverse emission effects are found in low-income communities.

Increasing focus on decarbonization and decreasing climate impacts profoundly affect the way our society functions, and the transportation sector is undergoing a major transformation. Booster already puts decarbonization of the transportation and fuel delivery sectors to the forefront of its business. This Report provides Booster direction on the next steps and creates a strategy for delivering positive outcomes in terms of environmental justice.

## Project’s objectives:

Booster tasked the Practicum Team of the Johns Hopkins University SAIS with the following objective:

*“Identify a broad strategy including specific activities, initiatives, and policies/regulations that allow Booster to leverage its MFOD business model to support a decarbonization transition, and in particular address the needs of under-served communities as part of a ‘just’ transition.”*

This analysis covers four geographic markets and four fuel categories summarized in Table 1.

Table 1.1: Markets and Fuels Analyzed in the Report

Markets	Fuels
<ul style="list-style-type: none"><li>- Federal</li><li>- California</li><li>- District of Columbia/Maryland</li><li>- Washington</li></ul>	<ul style="list-style-type: none"><li>- Conventional fuels (diesel and gasoline)</li><li>- Biofuels (E85 and E15)</li><li>- Electric charging</li></ul>

## Structure of the Report

Section 2 discusses the methodology used, research conducted, and experts interviewed. It also lays out the foundation of the environmental justice concepts and their importance for the Booster's decarbonization strategy (**Decarbonization Strategy**). Section 3 provides an overview of the Booster's MFOD business model, fuels, and presents the Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis of the MFOD business model.

Sections 4, 5, and 6 focus on three fuel categories - conventional (diesel and gas), biofuels, and electric charging - and include:

- regulatory and policy review applicable to the MFOD business model in four markets,
- implications for environmental justice,
- main trends and challenges, and
- recommendations specific for a relevant fuel category.

Section 7 describes an evaluation framework (**Evaluation Framework**), including metrics and a point system that we developed to test the suitability and feasibility of our recommendations against market conditions and environmental justice goals. It provides the basis for our final recommendations summarized in the Report.

Section 8 introduces the Decarbonization Strategy, which is based on the recommendations for each sector and the Evaluation Framework. It presents the most viable and promising solutions for Booster's MFOD business model. The Report concludes with Annexes and a bibliography.

## 2. Methodology

To identify a broad strategy for Booster in leveraging its MFOD business model in supporting decarbonization and environmental justice, we reviewed and analyzed regulations and policies applicable to the MFOD business model in four markets. After a detailed examination of the existing legislation and bills under consideration, we identified trends in policymaking, operations, and regulation for both conventional and renewable fuels. The SWOT analyses of each fuel and each market helped to identify and recommend potential business development opportunities for Booster that will promote decarbonization and contribute to environmental justice.

We conducted more than 20 interviews with key stakeholders in the energy, transportation, and environmental sectors, including professionals working in government transportation agencies, academic experts in urban planning, environmental justice group leaders, and energy and environmental policy journalists. Those interviews provided informative feedback on the MFOD business model, including the model's economic viability and scalability, and potential areas of expansion. Experts participated in an anonymous capacity, so their recommendations were used to inform our analysis, but are not identified or quoted in the Report.

### 2.1 Analytical Approach Framework

Our team created the Evaluation Framework, based on the input of experts and the conclusions derived from our research, to determine Booster's areas of expansion in each of the markets we studied. The Evaluation Framework, differentiated by fuel type, places scale values on the magnitude of regulatory burdens and policy incentives that form the foundation of the market landscape. The objective of the Evaluation Framework is to provide qualitative recommendations, reinforced by the quantitative

assessment, as to which markets Booster could pursue to achieve optimal business development potential and maximum positive impact towards environmental justice.

Booster's unique business model faces competition from two major vectors: fixed location gas stations and other firms operating MFOD business models. To determine the potential for business development, the Evaluation Framework assesses whether there are policies within a given market that provide Booster with a relative advantage over its competitors. To determine the potential for a positive impact on environmental justice, the Evaluation Framework assesses the degree to which a recommendation would reduce waste and emissions, particularly in disadvantaged communities. The Evaluation Framework endeavors to weigh the regulatory burden with the policy incentives to determine the aggregate impact of the regulatory and policy landscapes on Booster's potential business operations.

## 2.2 Environmental Justice Application

According to the EPA, "environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."<sup>vi</sup> The modern Environmental Justice Movement emerged in the 1960s as a compatriot of the Civil Rights Movement in America. A combination of discriminatory zoning laws, land-use policies, and housing discrimination endemic to the United States throughout the 19th and 20th centuries created an environment where communities of color and impoverished communities are disproportionately the victims of environmental destruction and degradation. Environmental justice refers to the deliberate unraveling of historical systems to reverse the harm to at-risk communities caused by environmental degradation. As a values-oriented organization, Booster has pursued an agenda of proactive environmental justice by engaging in business practices specifically designed to reduce waste, remove harmful static refueling infrastructure, limit carbon emissions, and provide needed services to historically at-risk communities.

Booster's focus on environmental justice in their business practices led the authors of this Report to devote specific attention to the potential for positive environmental justice outcomes. This Report, therefore, includes a particular analysis of the potential for a positive impact on the at-risk communities in each of the markets we analyzed. The Evaluation Framework assesses each market for the potential for environmental justice and social impact, traffic benefit, technical and economic feasibility, state of the policy and regulatory environment, and scalability

### 3. Overview of Booster’s MFOD Business Model

The basis of Booster’s MFOD business model is to bring fueling services directly to its customers. Booster uses specially designed trucks to fuel commercial and corporate fleets based on requests aggregated through an online application. The MFOD business model eliminates underground storage tanks and gas stations from the supply chain and brings fuel to customers directly from a fuel terminal. Usually, mobile fueling of corporate and commercial fleets occurs overnight, thus decreasing the network load during peak hours.

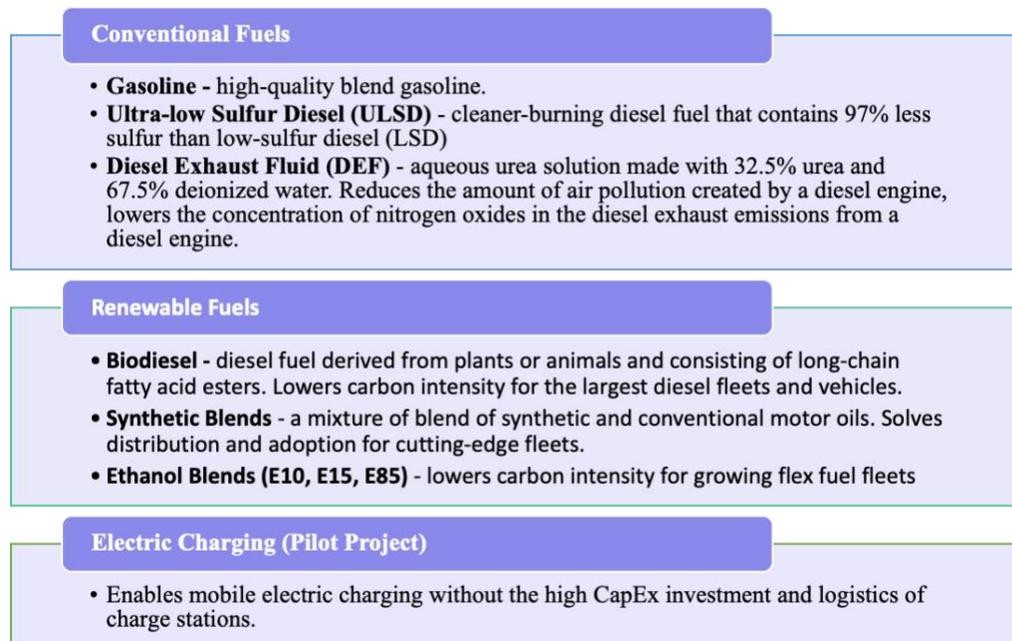
The MFOD business model is a relatively novel phenomenon. Although Booster and some of its competitors have operated in the market for at least seven years, many of the industry experts and stakeholders we interviewed were unaware of the model’s existence. Considering the importance of the MFOD business model for the energy transition and environmental justice, this lack of public awareness represents a barrier to the further expansion of Booster’s business and its equity contribution.

The major benefits of the MFOD business model to the transportation sector’s decarbonization are optimization of last-mile delivery, reduction of VMT to gas stations, a decrease in vapor emissions, including from gas stations’ pumps, and reduction of costs for customers. A scale-up of mobile fueling will accelerate the energy transition and address some of the most critical aspects of environmental justice.

#### 3.1 Types of Fuel Used by the MFOD Business Model

Booster’s services include the delivery of conventional and renewable energy fuels (Figure 3.1). The conventional fuels include high-quality blended gasoline, ultra-low sulfur diesel, and diesel exhaust fluids (DEF). Renewable energy products include biodiesel, synthetic blends, ethanol, and pilot EV charging.

*Figure 3.1 Types of Fuel Used by Booster’s MFOD Business Model*



The energy transition and challenges of the existing conventional fueling and electric charging infrastructures create opportunities for decentralizing a traditional fueling industry and implementing smaller-scale decarbonization solutions, where an application of the Booster’s MFOD business model can be extended. The Decarbonization Strategy outlined in Section 8 provides our vision of how the MFOD business model can be leveraged both for conventional and renewable energy products.

### 3.2 Existing Infrastructure

The MFOD business model does not require a stationary fueling or charging infrastructure, thus eliminating barriers to traditional conventional gas stations and expensive electric charging infrastructure. The avoidance of these capital costs creates benefits for Booster and its clients. The MFOD’s efficiency is based on fueling multiple vehicles per delivery and reducing the number of individual fueling trips, leading to environmental benefits through decreased emissions. Thus, in the Bay Area alone, mobile fueling can decrease annual CO<sub>2</sub> emissions from 97 metric tons, the average amount produced by a typical gas station, to 76 metric tons.<sup>vii</sup>

Our research confirmed that with the declining number of gas stations and low pace of creating EV stationary charging infrastructure, smaller-scale solutions will be required, therefore, creating growth opportunities for Booster’s business model: in the short to medium term for conventional fuels and in the medium to long term for renewable energy products.

### 3.3 General SWOT Analysis of the MFOD business model

Below is a summary of our general analysis of Booster’s MFOD business model based on our desktop research and key interviews conducted with industry practitioners (Figure 3.2). Figure 3.2 is not collectively exhaustive and includes only key characteristics applicable to all Booster’s services, regardless of fuel type. Figure 3.1 is derived from and consolidates SWOT analysis of specific fuels in Sections 4-6. The general SWOT analysis is instrumental for identifying overarching solutions for the Decarbonization Strategy.

*Figure 3.2 General SWOT analysis of the MFOD business model*

<b>Strengths</b>
<ul style="list-style-type: none"> <li>• Positive environmental impact</li> <li>• Increases accessibility to fueling services</li> <li>• Economic benefits for consumers</li> <li>• Decreases CapEx costs</li> <li>• Contributes to technologic progress and decentralization</li> </ul>
<b>Weaknesses</b>
<ul style="list-style-type: none"> <li>• Regulatory barriers</li> <li>• Limited technology readiness for electric charging</li> <li>• Lack of broad public awareness of the MFOD's existence</li> </ul>
<b>Opportunities</b>
<ul style="list-style-type: none"> <li>• Mobility hubs and public transit</li> <li>• Multi-family dwellings. Paratransit</li> <li>• Gas stations closure - substitute services</li> <li>• Elimination of legislative ambiguity and hurdles (e.g. siting plans, licensing)</li> <li>• Partnership with TNCs and car sharing</li> </ul>
<b>Threats</b>
<ul style="list-style-type: none"> <li>• Decrease of conventional fuel market</li> </ul>

## 4. Conventional Fuels: Gasoline and Diesel

### 4.1 SWOT analysis of conventional fuel services of Booster’s MFOD business model

Gasoline and diesel delivery services are the core of Booster’s MFOD business model. Below is a summary of our SWOT analysis of Booster’s conventional fuels products (Table 4.1). The key takeaways from our SWOT analysis:

- 1) The energy transition represents both threats and opportunities for Booster’s business. For example, although zero-emissions standards and gas stations’ closure trend increase demand for mobile fueling services in the short to medium term, they decrease the market for Booster’s conventional fuel delivery services in the long term.
- 2) If current restrictive or ambiguous regulatory provisions applicable to the MFOD business model (mainly concerning licensing and certification) are revised and updated, Booster’s MFOD business model can be leveraged and applied in many small-scale solutions for equity and environmental justice, like serving paratransit, on-demand public transit, microtransit, university and school shuttles.
- 3) Limited public awareness of the MFOD business model hampers its leverage and broader implementation within the energy transition. Higher awareness would contribute to more support for mobile fueling and new partnership opportunities for Booster.

*Table 4.1 SWOT Analysis of conventional fuel services of Booster’s MFOD business model*

Strengths	Weaknesses
<ol style="list-style-type: none"> <li>1. Increases positive environmental impact:               <ol style="list-style-type: none"> <li>a. reduces traffic congestion and VMT</li> <li>b. reduces CO2 emissions</li> </ol> </li> <li>2. Promotes environmental justice:               <ol style="list-style-type: none"> <li>a. addresses needs of low-income communities during the transition period (gas stations' closure, zero-emissions mandates, ban of sales of new ICE vehicles)</li> <li>b. increases accessibility, including for the disabled community</li> <li>c. Booster's fuel insights dashboard raises awareness of its clients about the environmental impacts of their vehicles</li> </ol> </li> <li>3. Decreases fuel costs and fueling time for consumers</li> </ol>	<ol style="list-style-type: none"> <li>4. Short-term:               <ol style="list-style-type: none"> <li>a. limited public awareness of the MFOD business model</li> <li>b. facilitates the use of ICE vehicles</li> <li>c. limited product differentiation with competitors</li> </ol> </li> <li>5. Long-term:               <ol style="list-style-type: none"> <li>a. limited window of profitability as markets transition to ZEVs over the next 30 years</li> <li>b. scalability is limited by restrictive regulation, including limitations related to carbon emissions, licensing of mobile fueling operation, and certification of mobile fueling equipment</li> </ol> </li> </ol>
Opportunities	Threats
<ol style="list-style-type: none"> <li>6. Increased avenues for partnership with state and local government fleets, especially in California and Washington</li> <li>7. Gas stations' closure trend as an opportunity for Booster's mobile fueling services</li> <li>8. Partnerships with TNCs and car-sharing services, if regulatory barriers, like site plan and public streets mobile fueling restrictions, are revised</li> <li>9. Service of mobility hubs and other connecting points with public transit</li> <li>10. With Booster's decarbonization initiatives, Booster can work to help clients get grants such as DERA and other fundings for zero-emission vehicle promotion</li> </ol>	<ol style="list-style-type: none"> <li>11. Gradual phaseout of ICE vehicles in the marketplace leading to the ICE obsolescence and decreasing demand for gasoline and diesel mobile fueling</li> <li>12. Increasingly strict zero-emissions mandates</li> <li>13. More stringent regulation at federal and state levels</li> <li>14. Intense competition from other MFOD businesses</li> </ol>

#### 4.2 Gasoline and Diesel Policy and Regulatory Review

Decentralization of the fuel market and global digitization have created opportunities for alternative ways of fueling. Now consumers can choose to fuel their cars or fleet not only at gasoline stations and fuel depots, but also by ordering mobile fueling. The mobile fuel delivery business is relatively nascent, and its regulation remains unclear. This Section summarizes the main policies and regulations of gasoline and diesel applicable to the MFOD business model by market. For more detailed information on policies and regulations related to Booster's MFOD business model, please refer to Annex 1.

## **Federal Level**

Since 2010, EPA’s diesel standards have required that all highway diesel fuel supplied to the market is ultra-low sulfur diesel (ULSD) and all highway diesel vehicles must use ULSD. After 2014, all nonroad, locomotive, and marine diesel vehicles have also been required to use ULSD. In 1998, California identified diesel particulate matter as a toxic air contaminant based on research that showed its potential to cause cancer.<sup>viii</sup> The most recent assessment by the World Health Organization’s International Agency for Research on Cancer in 2012 concluded that diesel engine exhaust is “carcinogenic to humans”.<sup>ix</sup> As a result, since 2006, EPA has been adding more stringent regulations to lower the amount of sulfur in diesel fuel. The diesel fuel standard for all high diesel fuel supplied to the market and all highway diesel vehicles is ULSD.

## **California**

Among other states, California has the boldest and most rigorous air quality and climate targets. In 2020, Governor Newsom set a state goal of banning the sale of new gasoline and diesel-powered cars by 2035, and the sale of new gasoline- and diesel-powered medium- and heavy-duty vehicles by 2045 in Executive Order N-79-20.<sup>x</sup> The goals set in 2021 are to make a 40% reduction in GHGs by 2030, an 80% reduction in GHGs by 2050, and a 50% reduction in petroleum use by 2030.

Since ZEVs that have no tailpipe emissions are two to five times more energy-efficient and thus more environmentally friendly compared to diesel vehicles, California proposed the Advanced Clean Truck Regulation to accelerate the large-scale transition of zero-emission medium- and heavy-duty vehicles from Class 2b to Class 8.<sup>xiii</sup> Therefore, it is highly unlikely that California will approve a further budget for retrofit programs. Instead, the state is shifting the focus to electrifying fleets to achieve zero-emission goals.

### *CARB’s Greenhouse Gas Standards for Medium- and Heavy-Duty Engines and Vehicles*

California Air Resources Board (CARB)’s GHG standards regulate Phase I systems for mobile fuel handling equipment and Phase II systems for stationary fuel transfers. Mobile fueling requires both Phase I and Phase II certifications.<sup>xiii</sup> This division of phases hampers mobile fueling because the same equipment must meet two different sets of standards. Therefore, an amendment of the CARB’s regulation is required to eliminate ambiguity and additional barriers to mobile fueling by unifying standards required for mobile fuel equipment.

### *California Fire Code*

California Fire Code represents one of the biggest challenges for mobile fueling. Its Section 5707 stipulates that “Mobile fueling operations shall not be conducted without first obtaining a permit and approval from the fire code official. Mobile fueling operations shall occur only at approved locations.”<sup>xiv</sup> Fire officials have the discretion to decide whether and where mobile fueling companies can operate. This discretion creates ambiguity in the regulation of mobile fueling, including who must be licensed for fuel delivery.<sup>xv</sup> As a result, some local authorities in California license the mobile fueling operator, while others require that a site plan must be developed for each location at which mobile fueling occurs.<sup>xvi</sup> This restriction represents a significant hurdle for small-scale application of mobile fueling, especially those solutions that could serve equity and environmental justice purposes. For more on the application of mobile fueling to equity and environmental justice please see Section 4.4.

## **Washington**

Transportation, the largest source of climate pollution in Washington, contributes nearly half of the statewide greenhouse gas emissions, among which diesel exhaust is responsible for 70% of Washington’s airborne cancer risk.<sup>xvii</sup> The Governor and Legislature are spearheading policies and initiatives to address climate change and improve public health by accelerating the transition from fossil fuels to a zero-emission transportation system.<sup>xviii</sup> Under the Climate Commitment Act, the government is in the process of developing new clean fuel standards and providing grants to clean diesel exhaust while promoting environmental justice.<sup>xix</sup>

## **Maryland**

In January 2022, Maryland lawmakers proposed an omnibus bill that sets statewide carbon emission goals and establishes specific actions, expecting to help Maryland in reaching net-zero carbon emissions by 2045 and the interim goal of 60% reduction by 2030.<sup>xxi</sup> In achieving these goals, the Maryland Department of Environment has been providing technical support, coordination, and grants to help government entities and private enterprises in controlling diesel vehicle emissions and transitioning to renewable energy, including zero-emission vehicle school bus programs and Diesel Vehicle Emissions Control Program.<sup>xxii</sup>

## **District of Columbia**

Washington D.C. has one of the country’s most aggressive and impactful clean energy actions to date as the government is requiring reduction of GHGs in 2032 to 45% below the 2006 baseline through the Clean Energy DC Omnibus Act of 2018.<sup>xxiii</sup> The law aims to electrify all public transportation vehicles and establishes a fee on conventional fuels. By 2045, all privately-owned commercial transportation will be required to be 100% zero emissions.

The FY 2022-FY2027 Capital Improvements Plan (CIP) provides approximately \$14 million to retrofit District government buildings and install new electric charging stations that will support the electrification of the District’s vehicle fleet.<sup>xxv</sup> The proposed FY 2023 Budget includes \$132 million to support the expansion and electrification of the Circular bus system, including additional charging capacity and new all-electric buses.<sup>xxvi</sup> These ambitious clean energy legislations indicate there would be less space for Booster’s MFOD business model to be taken out in the gas and diesel market.<sup>xxvii</sup>

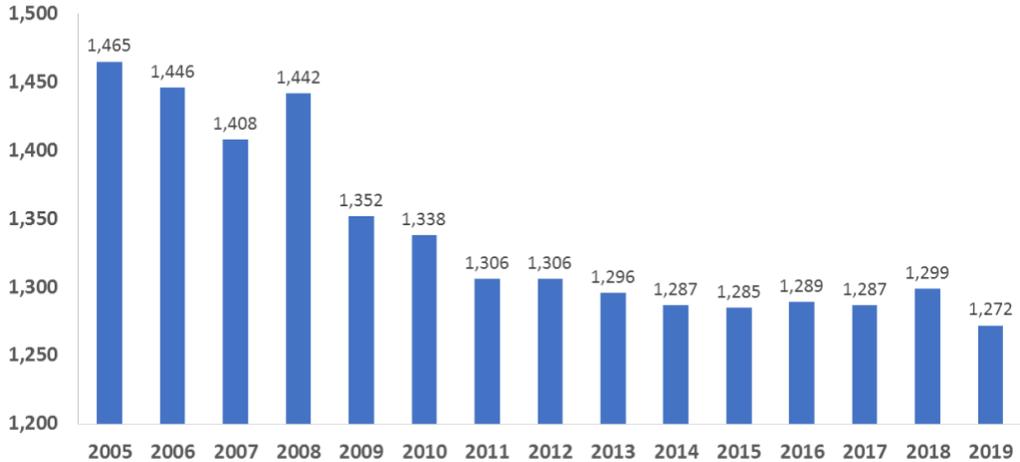
### **4.3 Trends and Challenges in Conventional Fuels**

#### **Closure of gas stations**

The closure of gas stations, especially in central business districts, is a growing trend directly impacting the application of the MFOD business model.<sup>xxviii</sup> Figure 4.3 illustrates the gradual decrease in the number of gas stations in the Washington Metro Area from 2005 until 2019.<sup>xxix</sup>

*Figure 4.3 Gas Stations in the Washington Metro Area (years 2005-2019)*

## GAS STATIONS IN THE WASHINGTON METRO AREA



Source: Bureau of Economic Analysis-Quarterly Census of Employment and Wages, Delta Associates, August 2020.

According to the National Association of Convenience Stores (NACS), the association for convenience and fuel retailing, there are up to 150,000 fueling stations in the United States, out of which 116,641 are convenience stores selling fuel.<sup>xxx</sup> About 55% of the convenience stores are single-store operators that lack the benefits and support of the chain stores. According to the NACS, retailer gross margins average 27.2 cents per gallon or 10.7% of the overall price and demonstrate decreasing profitability of gas stations operated by convenience stores. This is a structural trend that contributes to a decline of the total number of gas stations in the U.S.

The closure of gas stations has a negative effect on low-income communities. Usually, gas stations are closed first in the urban zones where wealthier communities reside. Therefore, the number of round trips to gas stations that are historically located in the “red urban zones,”<sup>xxxii</sup> residences of low-income communities, increases. This leads to higher pollution in low-income communities and higher mortality and disease rates.<sup>xxxii</sup>

At the same time, the overall effect of the decrease in the total number of gas stations is in line with zero-emission policy goals. For example, Petaluma in Sonoma County was the first city in the United States that banned in 2021 future gas station construction and any new pumps on existing sites.<sup>xxxiii</sup> With zero-emissions mandates supported by state and federal governments, there are indications that the trend toward the closure of gas stations will persist.

Based on the above, demand for Booster’s conventional fuel services will not only persist but will most likely increase due to the increasing closure of gas stations. First, Booster’s services will be required to address the pollution issues aggravated by the legacy of the zoning rules and the closure of gas stations (short to mid-term). Then, at a later stage, when there will be less and less ICE vehicles on the roads, Booster’s services will be required to provide fueling to the low-income consumers of the remaining ICE vehicles (mid to long-term).<sup>xxxiv</sup>

### Banning of ICE vehicles

Banning sales of new ICE vehicles is an emerging trend in the decarbonization of the transportation sector. Washington set the most ambitious target date of 2030.<sup>xxxv</sup> California’s and Maryland’s target date is 2035.<sup>xxxvi,xxxvii</sup> The District of Columbia has not passed similar legislation yet, nor is there a federal-level

mandate. However, the Build Back Better Act and the Infrastructure Bill contribute to creating conditions for banning new ICE sales by investing in EVs and charging infrastructure.<sup>xxxviii</sup>

This trend is part of the general policy and regulatory effort to decarbonize transportation. For Booster this trend indicates the need to switch to electric charging in the long-term while meeting the transition needs in the short to mid-term with its conventional fuel and biodiesel services (biodiesel is discussed in Section 5).

#### 4.4 Environmental Justice

##### **Increase in fuel availability and accessibility for low-income communities and disabled populations**

As the cost of an EV remains high, low-income communities will continue driving ICE vehicles and will have to rely on fueling at gas stations in the short to mid-term. During the energy transition period, more gas stations are closing due to the increasingly ambitious climate mandate and stringent regulations on ICE vehicles. Therefore, Booster's mobile fueling services can increase fuel availability and accessibility to a wider group of consumers, including a disabled community.

##### **Concerns of the environmental justice groups**

During our interviews with environmental group leaders, they expressed a concern that the MFOD business model facilitates use of conventional fuels, thus negatively impacting the energy transition, and in particular, low-income communities that are more exposed to climate change and face higher exposure to air pollution. The environmental groups' goals are to reduce the number of ICEs, decrease the range anxiety for EVs, and increase the scale of EVs' adoption, especially for low-income communities and communities of color. Thus, by providing more fueling methods of conventional fuels, Booster's MFOD business might hamper the adoption of EVs. However, our analysis suggests that positive environmental and economic impacts of the MFOD business model for low-income communities significantly outweigh the above concerns of the environmental justice groups.

#### 4.5 Recommendations

Below we provide recommendations based on our policy and regulatory analysis of conventional fuels mobile delivery.

##### **1. Continue collaboration with regulatory and executive authorities on optimization of federal, state, and local regulation of mobile fueling**

Existing policies and regulations are not tailored to mobile fueling industry needs. Overlapping certification requirements to mobile fueling equipment and stringent fire code rules on fueling operations are all limiting the areas of mobile fueling operation and hampering the implementation of the MFOD business model. These limitations are especially detrimental for those smaller-scale solutions that could significantly contribute to environmental justice and decarbonization. For example, one of the potential areas where the MFOD business model can serve environmental justice is mobile fueling of multi-family dwellings residents' cars, especially cars of persons with disabilities. However, fire codes' limitations for indoor mobile fueling preclude implementation of this solution. Therefore, it is essential to continue collaboration with regulatory authorities on tailoring optimal regulation of the mobile fueling that would contribute to the energy transition and support environmental justice.

**2. Deliver mobile fueling at mobility hubs and other public transport connecting points and metro centers**

With increased traffic congestion and ambitious zero-emissions goals, the development of public transit and hybrid forms of transportation will gain more traction. In this regard, mobility hubs as part of this hybrid transportation system may represent an opportunity for the expansion of the MFOD business model.

The San Diego Association of Governments (SANDAG) defines mobility hubs as places of connectivity where different travel options – walking, biking, transit, and shared mobility – provide an integrated suite of mobility services, amenities, and supporting technologies to better connect high-frequency transit to an individual's origin of destination.<sup>xxxix</sup> Motorists commuting to city centers for work can leave their cars at the mobility hub parking space, which in most cases is an outdoor area. Then they take the metro, public transit bus, or other means of mobility and come back to pick up their car at the end of the business day. Therefore, the ICE vehicles stay at the mobility hub parking for at least 5 hours every day. This time is enough for a day-light shift mobile fueling. In this scenario, Booster can either update its online application to include profiles of retail customers or enter into an agreement with a public state or municipal authority or any other third party that would operate the mobility hub.

Servicing of mobility hubs requires minimum amendments to the current regulation (if any at all) and does not require a change to the existing MFOD business model.

**3. Serve paratransit, on-demand public transit and microtransit, university and school shuttles**

Another area where Booster can contribute to environmental justice is mobile fueling of paratransit, on-demand public transit, microtransit, university, and school shuttles, as defined in Table 4.2. However, this solution has two main current limitations. If the above categories of transport are not parked in one depot space, then Booster faces the same regulatory limitations applicable to its other retail customers, like site plan permits and prohibition of fueling on public streets. Another limitation is the low margin for the Booster’s business. Currently, most of the vehicles under this recommendation get fuel at the gas stations affiliated with public transit or other state or local authorities. They buy fuel almost at the wholesale prices at such affiliated gas stations, which is lower than the retail price that Booster currently uses to price its services. Therefore, Booster’s fuel prices must be competitive, which might not fit its current MFOD business model. If these two major limitations are solved, then Booster can substantially contribute to equity and the energy transition by increasing access to mobility, while decarbonizing traditional fueling patterns.

*Table 4.2: Demand-responsive Transit Definitions*

Terms	Definitions
Paratransit	A demand-responsive mode of transportation for disabled and aging people who, because of their disabilities are unable to ride the fixed route public transit service. These services are usually provided by public transportation companies to complement their fixed-route services, but other paratransit operators include nonprofit organizations, community groups, and for-profit private agencies. Paratransits are often flexible in their scheduling and routing, allowing them to accommodate the specific needs of their riders. <sup>xlxi</sup>

On-demand Public Transit	A form of publicly subsidized transport that takes multiple passengers within a defined area from one place to another on a next-available or pre-booked basis. Typically, the service provides travel to or from a transport hub or local point of interest. These serves are most applicable in locations where there is insufficient demand for a frequent and direct mass transit solution. <sup>xlii</sup>
Microtransit (Demand Response Transit)	A form of transportation that allows agencies, from private individual transportations (cars, taxicabs, or TNCs) to public mass transit (bus), to offer riders an on-demand option that is more flexible than designated fixed routes and appointment-like paratransit. <sup>xliii</sup>

**4. Partner with TNCs and car-sharing services**

Booster can also contribute to equity and environmental justice by extending its service to TNCs and car-sharing services. However, there are two major barriers. First, taking into account that TNCs and car-sharing fleets are not parked in one geographic space, mobile fueling of such vehicles will require the wide-scale authorization of fire authorities. Second, serving such vehicles located in various spaces might not be economically viable for Booster from a cost-benefit perspective.

**5. Invest in educational programs and advertising to boost public awareness of the MFOD business model**

One of our major findings is the lack of public awareness of the MFOD business model. Therefore, investment in education programs and advertising might create new opportunities and potential partnerships for Booster, including collaborations with local communities.

**5. Biofuels**

**5.1 SWOT Analysis**

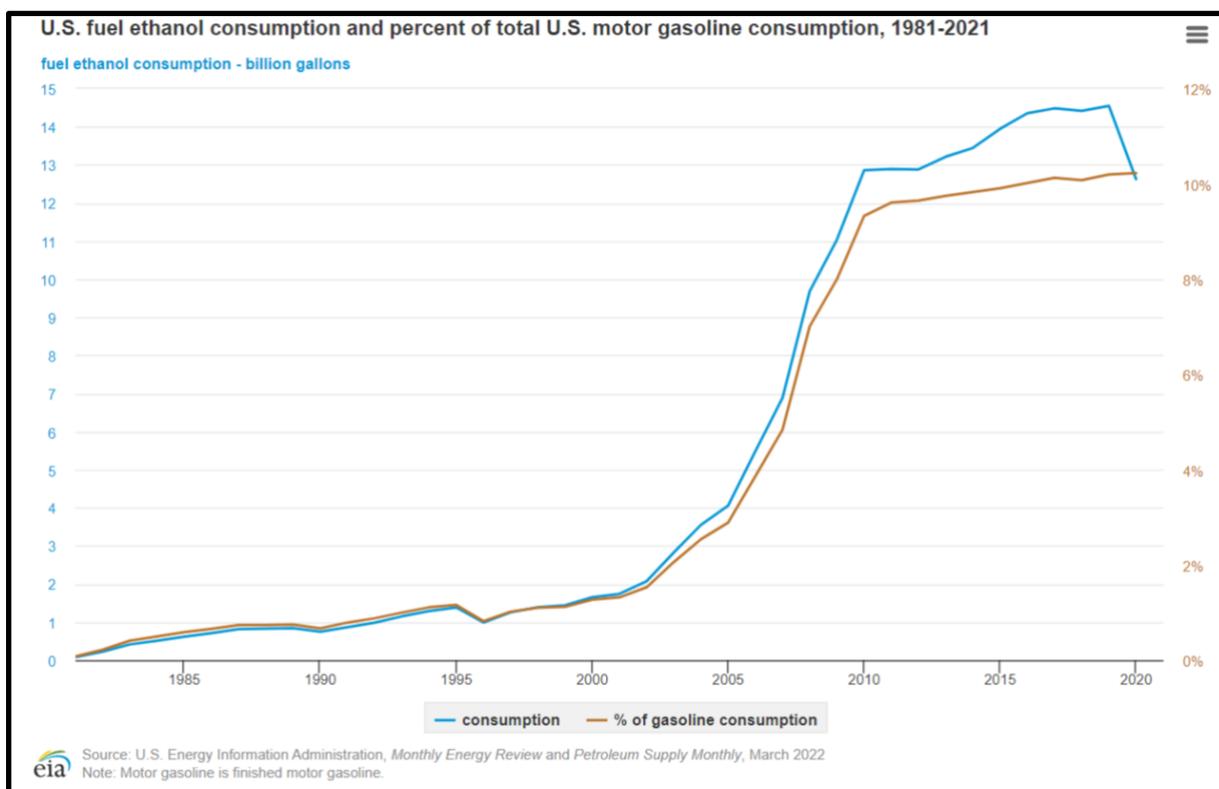
State and Federal governments have implemented policies and regulations to encourage the purchase of biofuel-compatible ICE vehicles. According to the U.S. Energy Information Administration (EIA), biofuel use increased significantly starting in 2002 when states began to ban the use of a gasoline oxygenation chemical known as Methyl Tertiary Butyl Ether (MTBE) due to fears of groundwater contamination. Biofuel consumption continued to rise due in large part to the passage of the Renewable Fuel Standard (RFS) requirements under the Energy Policy Act of 2005, which was expanded in 2007. As demonstrated in figure 5.1, U.S. fuel ethanol consumption grew from approximately 1% of gasoline in 2000 to just under 10 percent by 2012. The sharp rise in consumption of biofuels has subsequently grown much more slowly, by approximately 0.1 percent annually.<sup>xliv</sup> This historic growth will likely be altered in the near future as the Biden administration recently announced it would grant waivers to allow for the sale of E15 throughout the year. This will likely increase biofuel consumption in the short term, creating a positive pressure for consumers to rely more heavily on biofuels.<sup>xlv</sup>

Meanwhile, there has been a clear prioritization of state and federal investment toward zero-emission transportation infrastructure. For example, EV charging infrastructure is codified in the Biden Administration’s landmark infrastructure legislation, and major markets in the U.S. such as California and New York are providing favorable landscapes for new EV ownership. One particularly illuminating statement on this question lies in President Biden’s Executive Order 14037, *Strengthening American Leadership in Clean Cars and Trucks*, which sets a goal that “50 percent of all new passenger cars and

light trucks sold in 2030 be zero-emission vehicles.”<sup>xlvi</sup> President Biden has directed the Administrator of the EPA and the Secretary of Transportation to enact new regulatory standards for all vehicles beginning in the model year 2027.

This type of prioritization from government regulators is going to put pressure on vehicle manufacturers to provide the market with cars and trucks which satisfy higher standards for fuel economy. This presents a unique market landscape for the MFOD business model with respect to biofuel distribution. Booster’s status as an incumbent in the MFOD market means that they have an advantage over any potential new-to-market competitors. Depending on the magnitude of the forthcoming rules and regulations, manufacturers may respond by prioritizing the design and distribution of future biofuel vehicles.

Figure 5.1. U.S. Energy Information Administration: U.S. Fuel Ethanol Consumption and Percent of total U.S. motor gasoline consumption, 1981-2021<sup>xlvii</sup>



Nevertheless, there is also some uncertainty since the same fuel economy rules may lead to higher investment in EVs and hydrogen-powered vehicles. Publication of these new rules will have an illuminating impact on the potential for future business development in the biofuel MFOD environment. Some municipalities have a higher growth potential than others due to state and local regulations and policies. The relevant policies are identified and analyzed in the next section.

The ultimate “threat” to the MFOD business model of biofuel distribution is the economy-wide transition towards zero-emission vehicles, which will likely occur over a period of several decades. There will be diminishing returns on capital investments in biofuel MFOD as the possible sunset of the internal combustion engine era inches closer year by year. It is therefore recommended that Booster seize the opportunity to capitalize on the favorable current market conditions and maximize returns on currently

employed capital for as long as possible. This means exploring new and creative strategies for customer recruitment and engaging in strategic foresight to anticipate potential customer transitions from conventional fuels to biofuels.

*Table 5.2. SWOT analysis of MFOD business model in biofuels sector*

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>- Incumbent in a market that can only support a limited number of providers.</li> <li>- Subset of biofuel consumers overlaps well with the characteristics of Booster customers.</li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>- Biofuel adoption appears to be plateauing in the United States.</li> <li>- Biofuel deployment opportunities are potentially limited to highly restrictive market environments including ports and airports.</li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>- Certain markets provide increased avenues for partnership with state and local government fleets.</li> <li>- Higher emissions standards for heavy-duty trucks are likely satisfied by the transition from conventional to biofuels rather than technological evolution to EVs or Hydrogen.</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>- Growing regulatory burden on emissions coupled with consumer demand for renewable fuels potentially leads to the gradual and very long-term phaseout of internal combustion engines in the marketplace.</li> </ul>

## 5.2 Policy and Regulatory Review

There are overlapping layers of biofuel policies and regulations based on the jurisdiction. The overarching policies initiated by the Federal Government originate from Congressional Legislation and from administrative actions undertaken by the Executive Branch. These federal statutes impact all the markets subject to this scope of work and are an important context for understanding the market landscape. State and local policies also exist in different iterations across the separate market, providing for a range of market landscapes depending on the geographic region being analyzed.

The regulatory landscapes in Washington and California provide Booster with unique opportunities to develop a greater diversity of customers. Both states currently have higher fuel efficiency standards than the Federal government mandates. There are also robust incentive programs for businesses and individuals to purchase alternative fuel vehicles, including flex-fuel and E85 compatible vehicles. The combination of both these factors creates an opportunity for market expansion. The full list of relevant policies and regulations can be found in Annex #2.

### Federal Level

Executive Branch policies are rules and regulations that originate from the Executive Agencies, such as the Departments of Energy, Transportation, Treasury and Agriculture, as well as the Environmental Protection Agency. In the first week of President Biden’s Administration, the President announced a policy of enhanced action to “avoid the most catastrophic impacts of [the climate crisis] and to seize the opportunity that tackling climate change presents.” One major component of this Executive Order was to direct the heads of agencies to identify any fossil fuel subsidies provided by respective agencies and then to eliminate all fossil fuel subsidies from the budget request for the Fiscal Year 2022 and thereafter (Sec. 209). According to one study, “direct subsidies to the fossil fuel industry totaled \$20 billion per year, with 80% going toward oil and gas.”<sup>xlviii</sup> Not all of those subsidies originated from the Federal budget, but it

would be reasonable to assume that a complete cessation of Federal subsidies for fossil fuels will lead to increased consumer costs for fossil fuel products. This policy will likely have some negative impact on the total cost of business for the MFOD business model but could incentivize enterprises transitioning to biofuel fleets if the cost of biofuels increases less than comparable petroleum products.

President Biden also announced a policy to “improve our economy and public health, boost energy security, secure consumer savings, advance environmental justice, and address the climate crisis.” The major priority of this policy is to set a goal that 50 percent of all new passenger cars and light trucks sold by 2030 be zero-emission vehicles. The President has directed the Administrator of the EPA and the Secretary of Transportation to generate new rules to govern fuel economy and multi-pollutant standards under the authorities of the Clean Air Act and the Energy Independence and Security Act. These new fuel standards will be published over the course of several years to ultimately impact vehicles manufactured with the model year 2027 and extending through at least the model year 2030.

The impact of this policy objective will not be clear until the publication of the new rules, so for now the implications for the MFOD business model are ambiguous. On one hand, the prioritization of positive environmental justice outcomes will likely lead to more stringent carbon intensity restrictions. This kind of regulatory pressure on car manufacturers may incentivize them to produce vehicles that are capable of consuming biofuels as the carbon intensity is lower than conventional petroleum-fueled ICE. Alternatively, since the stated goal is a complete market transition to zero-emission vehicles, the regulatory pressure may cause manufacturers to invest heavily in the development of EV and hydrogen fuel cell vehicles. This kind of market reorientation would dramatically limit the potential for new biofuel MFOD clients over the next ten years. Clarity on this position will come when rules are released by the relevant department heads in the coming months.

The Federal government offers cities tools to promote clean energy policies through the Clean Cities Coalition Network, administered by the Department of Energy. Nine major cities in the California, Washington and D.C. metropolitan region have signed onto the Coalition Network, which could serve as a means through which Booster could gain additional leverage in those cities. According to the Clean Cities Coalition Network mission, “Clean Cities Coordinators... work with local fleets to advance affordable, domestic transportation fuels and technologies in the cities and counties they serve.” Booster can connect with designated Clean Cities Coalition Network representatives in target markets by visiting the Coalition Contact Directory at <https://cleancities.energy.gov/coalitions/contacts/>.<sup>xlix</sup>

The Environmental Protection Agency has created an incentive-based program designed to reduce emissions by “encouraging port authorities and terminal operators to retrofit and replace older diesel engines with new technologies and use cleaner fuels.”<sup>li</sup> Ports offer a potentially creative opportunity for Booster to expand its customer base since the operational infrastructure is constrained within a finite geographic area and Booster could provide a competitively priced service that reduces emissions versus competition. EPA regulations are layered with specific state and local regulations, which are explored further in future sections.

Similarly, the Federal Aviation Administration created an initiative called the Voluntary Airport Low Emissions (VALE) program designed to help reduce the carbon footprint of airports across the country. Through the VALE program airport administrators have access to funds to “finance low emission vehicles, refueling and recharging stations, gate electrification, and other air quality improvements.”<sup>li</sup> The major airports in the regions studied in this Report have historically received funding through the VALE program. These include: Baltimore Washington International, Los Angeles International, San Diego International, San Francisco International, Seattle-Tacoma International, Spokane International, Washington Reagan, and Washington Dulles.<sup>lii</sup>

## **California<sup>liii</sup>**

California has arguably the most progressive clean energy policies of any state in America. California's codified commitment to emissions reductions provides a policy and regulatory landscape that opens up opportunities for Booster to expand business capacity in biofuel MFOD. There are likewise a series of policies and regulations that place burdens on all fossil fuel consumption across California. The tension between these two opposing forces results in a complicated state-wide landscape.

Southern California has historically suffered from very poor air quality, and state- and local-level policies have been aggressively deployed to curb particulate air pollution. For example, The South Coast Air Quality Management District (SCAQMD) requires government fleets and private contractors under contract with public entities to purchase non-diesel lower emission and alternative fuel vehicles. The rule applies to transit bus, school bus, refuse hauler, and other vehicle fleets of at least 15 vehicles that operate in Los Angeles, San Bernardino, Riverside, and Orange counties. This requirement provides an avenue for new customer recruitment, concentrating business development in fleets of vehicles that serve as government contractors.

One policy that California has deployed to improve air quality is the California Low Carbon Fuel Standard. The California Air Resources Board regulations require transportation fuel producers and importers to meet specified average carbon intensity requirements for fuel. Biofuels are a qualifying fuel as long as the ethanol concentration is greater than 10% by volume. The California LCFS program creates a regulatory burden on fleets to reduce emissions, which incentivizes them to transition their vehicles away from conventional fuels and invest in biofuel compatible heavy-duty vehicles.

Furthermore, California's Fleet Vehicle Procurement Requirements impose constraints on vehicle procurement contracts so that entities affiliated with city, county and special district governance can require that purchased vehicles be energy efficient. This efficiency requirement is satisfied by alternative fuel vehicles that assist California in meeting its low emission objectives.

California has the most stringent vehicle emissions standards in the United States. The regulatory burden on conventionally fueled fleets creates a unique incentive for potential fleet customers to invest in low carbon-intensity biofuel vehicles rather than conventionally fueled vehicles.

## **Washington<sup>liv</sup>**

Regulations in Washington provide unique opportunities in the development of biofuel distribution. The policy landscape promotes expanded access to biofuel suppliers, mandates alternative fuel vehicle purchases for state agencies, and imposes a mandatory minimum biodiesel requirement for all heavy-duty state-owned vehicles. This combination of policies presents a favorable landscape for biofuel distribution via the MFOD business model.

The Washington Alternative Fuel Use Requirement requires that all state agencies, to the extent practicable, use 100% biofuels or electricity to operate all publicly owned vehicles. For vehicle classes without EV model options, agencies must prioritize the most cost-efficient, low-emission vehicle option available. This is particularly pertinent to the Booster MFOD business model, as it has considerable experience providing fuels to medium-duty and heavy-duty vehicles. Heavy-duty EVs are a considerable distance off into the future, and as a result the agencies under the umbrella of the Washington alternative fuel use requirement will gravitate towards biofuel vehicles as a cost-efficient and low-emission option.

The alternative fuel use requirement has a biofuel supplier framework built into the policy: "To allow the motor vehicle fuel needs of state and local government to be satisfied by Washington-produced biofuels,

the Washington Department of Enterprise Services and local governments may contract in advance and execute contracts with public or private producers and suppliers for the purchase of appropriate biofuels.” Booster can take advantage of this supplier framework to expand business with Washington’s state and local agency fleets.

Washington, through the Department of Ecology, is developing rules to establish a Clean Fuels Program that reduces the overall carbon intensity of transportation fuels used in the state by 20% by 2035. Biofuels deployment in the heavy-duty transportation sector will very likely be incorporated into that future framework, setting the groundwork for long term viability in the biofuel MFOD business model market.

### **D.C. Metropolitan Region<sup>lv</sup>**

The District of Columbia metropolitan region consists of three neighboring jurisdictions: Maryland, Virginia, and the District of Columbia itself. Existing regulations in Virginia present barriers to the Booster MFOD business model, and it is unclear when or if those obstacles will be removed in the future. While there are some policies in the region that promote biofuels as a source of clean energy, legislators in the District of Columbia and in Maryland have chosen to prioritize incentives for zero-emission vehicle adoption over creating programs to generate higher biofuel consumption.

One policy that supports biofuels is the District of Columbia’s alternative fuel vehicle acquisition requirement. D.C. code requires fleets that operate at least 10 vehicles in the District of Columbia must ensure that 70 percent of newly purchased vehicles with a Gross Vehicle Weight Rating (GVWR) of 8,500 lbs or less and 50 percent of vehicles with a GVWR between 8,500 lbs and 26,000 lbs are clean fuel vehicles. For this requirement, a clean fuel is any fuel, including diesel, ethanol (including E85), hydrogen, propane, natural gas, reformulated gasoline, or other power source (including electricity) used in a clean fuel vehicle that complies with standards and requirements applicable to such vehicles. This policy allows for clean diesel trucks to take the place of biofuels like E85, so the long-term effect on biofuel adoption is ambiguous.

D.C. also encourages businesses and individuals to convert their vehicles from conventional fuels to alternative fuels through the alternative fuel vehicle conversion and infrastructure tax credit. The tax credit allows for up to \$19,000 per vehicle if the owner converts to a qualified alternative fuel, including ethanol blends of at least 85 percent, natural gas, propane, biodiesel, electricity, and hydrogen. This policy serves well for Booster with new and existing conventional fuel MFOD customers in the region, as Booster will be able to assure customers that their service will continue uninterrupted if the customer decides to take advantage of the conversion tax cut.

## **5.3 Environmental Justice Applications**

Biofuels are one part of the toolkit that will help the United States reach net-zero emissions. Biofuels can help to reduce greenhouse gas emissions by 40 - 108 percent across the lifecycle of use depending on the fuel stock, whether the ethanol in the biofuel is rendered from a corn-base or from a cellulosic feedstock.<sup>lvi</sup> Replacement of conventional fuels in high-pollution industrial zones such as ports and airports will have a considerable positive environmental justice outcome for the communities in close proximity. For example, one assessment of GHG emissions in the Port of Los Angeles found that emissions from heavy-duty vehicles accounted for nearly 400,000 tonnes of Carbon Dioxide equivalents in 2020.<sup>lvii</sup> California is one of the most active states in the pursuit of green infrastructure policy, and operators of fleet vehicles that service California’s ports are facing regulatory pressure to reduce emissions. Booster has the opportunity to contribute in a meaningful way to the reduction of emissions

around the Port of Los Angeles by providing fleet operators with reliable access to E85 and other biofuels.

The same can be said about the efforts to limit emissions in Washington by encouraging businesses and government fleets to transition to cleaner fuels. Washington is implementing supplier frameworks and policies that make it very easy for historical emitters to transition to fuel types, like E85, that come with a lower carbon footprint. Booster can contribute to the reduction of carbon and particulate emissions in communities surrounding industrial areas by providing reliable sources of low emission fuels to private and government fleets.

#### 5.4 Trends and Challenges in Biofuels

One trend that could potentially inhibit the long-term viability of the biofuel MFOD market is the prioritization of electric and zero emissions vehicles by the federal government. The District of Columbia metropolitan area is likewise moving in the direction of incentivizing businesses and municipalities to invest in EV and zero emissions transportation infrastructure. Prioritization of zero-emission vehicles over the very long term will likely lead to firms investing in EV and hydrogen fuel cell fleets rather than spending money on retrofitting conventional engines to be biofuel compatible. This presumption is contingent on technological development of these zero-emission systems accelerating over the coming years, to a point where heavy duty EVs are not only available and cost competitive, but that the fuels for these zero emissions systems are abundantly available. Therefore, this challenge should be considered as part of a long-term strategy planning horizon.

#### 5.5 Recommendations

California and Washington have implemented clear policies that will incentivize the adoption of vehicles that run on E85 and other ethanol blends. Incorporating biofuels into the fuel mix for government fleets will likely lead to a greater marketplace for biofuel distribution via the MFOD business model. Booster can be secure in the longevity of biofuel distribution in these specific markets.

1. **Provide refueling services to government owned fleets in specific markets.** Washington and California both have mandates for alternate fuel use and vehicle acquisition that will include biofuels. In Washington especially, there are frameworks designed to guarantee that government fleets have adequate availability of biofuels. Booster should tap into this mandatory market.
2. **Support heavy duty vehicles at airports.** The VALE program administered by the FAA provides funding for airport authorities to reduce the carbon footprint of their infrastructure. This also has a positive impact on communities surrounding airports, by reducing the concentration of greenhouse gasses and particulate matter.
3. **Support heavy duty vehicles at ports.** Heavy duty vehicles at ports are constrained geographically and demand a high volume of fuel due to continuous operations. In Washington and California, these vehicles are required to use alternative fuels such as E85. The Booster team provides services to some of the companies that operate within the confines of these ports. It would be beneficial to solicit new customers from among the firms that operate within these contexts, as they are likely demanding reliable and convenient sources of alternative fuels.

## 6. Electric Charging

### 6.1 SWOT Analysis of EV charging MFOD business model

Mobile on-demand electric charging for EVs is a new model for Booster. It has a significant number of benefits but also presents challenges in its deployment.

It is a mobile solution that can decrease time spent on charging by customers as it could be done overnight or during the workday. It can bolster EV adoption for groups that currently lack access to permanent infrastructure and live in “charging deserts,” which are likely to coincide with low-income, underserved, or ethnic minority neighborhoods. Accelerating the transition to EVs in low-income groups supports environmental justice, as currently these customers are more likely to be exposed to point emissions from ICE vehicles and to spills and emissions from gas stations, affecting their health.

Opportunities range across markets and sectors, including partnering with TNCs that experience challenges with transition, providing services to people lacking on-site charging, and utilizing solutions used in the conventional fuel MFOD business model. The current uneven distribution of charging infrastructure across neighborhoods of different incomes can help support environmental justice and unlock new customer groups.

However, this window might be closing as an influx of federal, state, and private funding toward charging infrastructure across the board will make mobile charging solutions redundant in the long term. Current technological limitations of mobile charging equipment present a challenge and require additional research, as the Booster EV pilot project showed. Electricity rates also differ significantly across markets and achieving competitiveness with stationary charging might be difficult in the short-term unless the MFOD business model is implemented on the scale.

*Table 6.1. SWOT analysis of MFOD business model in electricity and EV sector*

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>- Mobile solution that does not require permanent infrastructure</li> <li>- Decreases time spent charging for customers</li> <li>- Customers are acquainted and like app-based and delivery services</li> <li>- Encourages EV adoption on scale</li> <li>- Environmental benefits</li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>- Technological limitation of delivering EV charging on demand: battery size, type of current, waiting times</li> <li>- High costs of mobile charges and electricity rates</li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>- Capitalize on the uneven distribution of permanent EV charging infrastructure</li> <li>- Partnering with TNCs</li> <li>- Adopt campus and fleet approaches used in the conventional fuel delivery</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>- Closing window of opportunity due to scale up of permanent EV charging infrastructure</li> <li>- Challenges with accessing low EV charging rates as utilities come into the charging space</li> </ul>

## 6.2. Lessons from the Booster EV Pilot<sup>lviii</sup>

The EV mobile charging project piloted by Booster highlights many technical limitations of the model. Lack of battery capacity, its high weight, variability of charging times, need for adapters for certain car models (Tesla vs. Nissan Leaf technological differences), and long charging times present challenges for wide-scale adoption of this model at the moment.

*Table 5.2. Specifications of equipment and battery used in Booster pilot*

Specifications of equipment and battery used in Booster pilot	
Number of batteries	8 batteries
Battery charging time	3-4 hours per battery, 24-hour capacity (cannot be charged in advance)
Battery weight	50 lb per battery and 5-10 lb Tesla adapter, very difficult to transport and maneuver
Voltage	20-amp 240-volt circuit
Time to charge vehicles	1 mile per minute for Tesla and 2+ miles per minute for Nissan Leaf
Max number of customers per day	8 customers at 12 miles charge

However, the industry is expecting progress in battery technologies. Some companies provide products that can fit Booster's needs for this line of business. The solutions would require the following characteristics:

- decreased charging time per unit of equipment
- more consistent charging time across different vehicle models
- equipment that is easier to transport and maneuver across the parking lot
- less strict requirements for the parking lot surface area (current charging equipment cannot handle hills).

Blink Mobile EV charging station (IQ 200-M) is an example of equipment that fits some specifications.<sup>lix</sup> According to the technical product description, it provides 240-volt AC charging, delivering up to 9.6kW of charge, and can supply up to 1 mile of charge per minute.

There might be other products coming to the market that can solve some of the current technological limitations for EV mobile charging and be used for the MFOD business model.

This chapter assumes the availability of charging batteries and equipment compatible with different vehicle models and proceeds based on such an assumption.

## 6.3. Policy and Regulatory Review

Overall, there is a significant push in all four markets to increase EV ownership in private and public fleets and the installation of charging equipment on-premises in public and private locations. However, current laws and funding availability differ across the four markets. This section summarizes and analyzes policies and regulations relating to increasing EV adoption, scale-up of EV charging station availability,

and funding opportunities for personal vehicles, commercial, federal, and municipal fleets across four markets. The complete list of reviewed policies and regulations can be found in Annex 3.

## **Federal Level**

On the federal level, the recent *Infrastructure Investment and Jobs Act* provides funding to accelerate the deployment of EV charging infrastructure across the country.<sup>lx</sup> If the availability of permanent EV charging infrastructure increases significantly, there might be decreasing space for mobile charging options. At the same time, current legislation does not specify the allocation of charging infrastructure, and the funds will primarily be used at the discretion of state and municipal governments. Therefore, some municipalities might lag in the EV charging infrastructure build-up, especially in underrepresented and underserved communities that historically lack infrastructure options and innovative solutions, leaving a window of opportunity for the Booster mobile solution.

Another area of interest is a significant investment and increasing requirements for electrification of school bus fleets under the *Infrastructure Investment and Jobs Act* and the *2021 American Rescue Plan*. These directives specifically reserve funding for underserved communities.<sup>lxi</sup> This can open up an opportunity for Booster to partner with schools to deliver mobile charging services to electrified school fleets if the on-site charging infrastructure is not available, does not meet the capacity requirements, if electricity rates are too high, or the grid is not reliable to supply enough power for charging.

## **California**

California is the most advanced state regarding requirements for EVs and EV charging infrastructure. It is one of the states that adopted right-to-charge laws: under the *Civil Code 1947.6(a), (b), Commercial Lease EV Charging Stations*, tenants have a right to install “EV charging stations for both owner-occupied and renter-occupied units in condos, co-ops, and planned communities within an owner’s unit or in designated parking space” with the caveat that the installation can occur in the common area if installation in the owner's designated parking space is impossible or unreasonably expensive.<sup>lxii</sup> This can harm Booster's Business as the law implies that EV owners have a right to install permanent charging infrastructure. At the same time, if the permanent installation is impossible or too costly, alternative charging models, such as Booster, can come into play. These laws can open up a significant opportunity for partnering with landowners.

The state also has several requirements and funding options for transitioning toward zero-emission trucks, buses, off-road equipment, and medium- and heavy-duty vehicles in the next decade. This means that a significant number of agencies and companies will need to electrify their fleet.

California also introduced the *Clean Off-Road Equipment (CORE) Incentive Project*, which aims to accelerate the adoption of zero-emission off-road freight equipment, such as terminal tractors, trucks, large forklifts, and others. Executive Order N-79-20 compliments the Project and establishes a goal of 100 percent off-road equipment and vehicles to be electric. If the agencies do not have access to permanent charging infrastructure due to moving facilities and parking locations (such as off-road equipment companies), lack of interim funding for permanent infrastructure, Booster can partner with them to provide mobile services.

*SB 1044, the Clean Miles Standard and Incentive Program*, aims to reduce emissions from ridesharing services or TNCs, such as Uber and Lyft, and requires 90 percent of vehicle miles traveled to be electric by 2030. This can open an opportunity for Booster to help TNC drivers to charge their cars or partner with TNCs. This opportunity is further discussed in the recommendations.

## Washington

Washington has passed several policies for electrification of publicly owned vehicles, such as *Executive Order 21-04 Zero Emission vehicles* and the *RCW 43.19.648 Publicly-owned vehicles, vessels, and construction equipment. The Alternative Fuel Vehicle (AFV) Car Share Pilot Program* in the 2023-2025 period lays out plans to increase access to AFVs use opportunities for underserved and low-income communities. Organizations with a proven track record of delivering similar projects can participate in the bidding process. Booster can utilize this or equal legislative opportunities to provide charging to underserved communities that lack access to permanent charging infrastructure. Collaboration with carsharing services for charging provision should also be under consideration and is further discussed in the recommendations below.

In terms of charging equipment requirements legislation, according to the *House Bill 1278,2021 and RWC 19.27.540 Mandatory EVSE Building Requirements* in all new buildings with on-site parking, at least one, or 10% of parking space, must be made available for Level 2 EVSE. Moreover, electrical capacity must accommodate the potential to serve a minimum of 20% of the total parking spaces with Level 2 EVSE. This policy can be interpreted as a negative development for Booster as new houses will lack the need for mobile charging solutions. The state currently also lacks right-to-charge laws, such as in California and Maryland, that would prevent condominium and homeowner associations from restricting the use and installation of equipment for EVs.

## District of Columbia and Maryland

The District of Columbia and Maryland have policies and regulations promoting a transition to electric and zero emission fleets.<sup>lxiii</sup> This includes requirements for public buses, passenger- and light-, medium- and heavy-duty vehicles, taxis, and limousines services.

Maryland is one of the states with right-to-charge laws (*MD House Bill 0110, Condominium Act, and the HOA Act*), which prohibit condominium and homeowner associations from restricting the use and installation of equipment for EVs in “a unit owner’s deeded parking space or a parking space that is specifically designated for use by a particular owner.” The charging equipment should not “reasonably impede the normal use of an area outside the unit owner’s parking space.”<sup>lxiv</sup> If the space is limited in the parking garage, this law may require the provision of alternative charging methods by landowners, such as Booster mobile charging solutions. These laws can open up a significant opportunity for partnering with landowners.

Maryland also passed the *House Bill 784, 2021, EVSE New Construction Requirement*, requiring new houses to be equipped with the Level 2 charging infrastructure or pre-wiring.<sup>lxv</sup> Builder companies are also required to disseminate information about available rebate programs for charging equipment in the municipality. This may close the opportunity for Booster to supply charging to homeowners as they will have easy access to permanent charging equipment on-premises.

*District of Columbia Code 50-741: Transportation Electrification Program - Emission Reduction Plan for Transportation Network Companies* introduced a requirement for TNCs to develop emission reduction plans and submit them to the DC Public Service Commission on a bi-annual basis starting from February 1, 2022. Plans should include actionable proposals to decrease emissions, increase the proportion of drivers operating EVs, and boost the percentage of electric miles delivered by services.

## 6.4. Environmental Justice Applications

Booster’s mobile EV charging model can help encourage EV adoption, unlock environmental and economic benefits for all groups, including underserved and low-income communities, and provide just transition solutions. This section describes some environmental justice issues that Booster needs to consider and can address through its services.

### **Expanding Access to EVs**

Currently, EVs are considered luxury goods, and their medium price on the market is still too high for the average consumer and even more so for the lower-income level group.<sup>lxvi</sup>

Currently, in California (the most developed EV market), EV buyers are mostly “male, high-income, highly educated, homeowners, who have multiple vehicles in their household, and have access to charging at home.”<sup>lxvii</sup> In California, EV consumers have a mean income of \$190,000, 81 percent are household owners and have a college degree, and 75 percent are male.<sup>lxviii</sup> In Maryland, only 4 percent of EV buyers are Black, whereas the state population is 30 percent Black.<sup>lxix</sup> Adoption of Teslas as a proportion of all household vehicles is 15 times higher in the top 20 percent of zip codes by income than in the lowest 20 percent; for Nissan Leaf, the adoption rate is 5.7 times higher in high-income households, and 4.3 times higher for Chevrolet Volt, the most popular EV models on the market.<sup>lxx</sup> Black and Latino consumers represented 41 percent of ICE vehicles purchasers in 2019, but only 12 percent of EVs.<sup>lxxi</sup>

Moreover, two-thirds of customers in the US purchase used vehicles, and the used market for EVs is nascent at the moment.<sup>lxxii</sup> However, the current cost reduction in new EVs is likely to decrease prices for used EVs and cost parity with ICE vehicles by 2025-2030.<sup>lxxiii</sup> The total cost of EV ownership is also projected to decrease in the upcoming years. Already in 2019, consumers in disadvantaged communities in California purchased used EVs at higher rates than new EVs, showing that this trend is likely to continue.<sup>lxxiv</sup>

Rebates for EVs and charging equipment are accessed more by middle and high-income customers. Most often such purchases still demand high upfront costs to be paid by consumers that would be reimbursed through taxes after a certain period. Low-income customers might not have enough disposable income to spend on this category of goods.

At the same time, the total cost of EV ownership can be lower than for ICE vehicles due to decreased vehicle purchase, maintenance, and fueling costs, which can account for up to two-thirds of overall vehicle ownership. Decrease in these costs can significantly alleviate the burden for low-income groups, as for groups with an annual income below \$25,000, vehicle ownership costs can rise to over 50 percent of income, in the range between \$25,000 and \$50,000. The same statistic can rise to 25 percent.

For the reasons outlined above, for low-income customers, it might be challenging to access the EV market at the moment before the average price of EVs drops, and the used EV market grows. Therefore, it might take a few car ownership cycles for low-income customers to become EV owners. However, over the next decade, low-income consumers are likely to become EV owners and require access to charging infrastructure. This can become a medium-term opportunity that Booster can leverage to gain new customers and support EV owners from low-income backgrounds and underserved communities once they join the EV market.

### **Ensuring Access to EV Charging Infrastructure**

Low-income car owners are also less likely to have a regular place of work, making it difficult for them to rely on charging equipment in work parking lots. Moreover, public charging costs can be 2-4 higher than home charging, putting an additional burden on low-income households.

At least 36% percent of the US households reside in rented housing.<sup>lxxv</sup> 17% of renters live in 2-4 unit housing and 37% in 5 or more unit housing.<sup>lxxvi</sup> The number of rental housing has increased by ten million new households in the last 10 years, whereas the homeownership rate is at historic lows. Across 43 million rental units in the US, the majority or 28.9 million, are multi-unit and 13.2 million are single-family.<sup>lxxvii</sup>

Residents from low-income communities and those residing in multi-family dwellings face additional challenges in accessing charging infrastructure. The barriers include lack of public charging stations in communities or on-premises, high upfront costs for home chargers, lack of space for charging installation, and lack of laws and regulations or their enforcement for installing of EV chargers on-premises.

Public charging infrastructure is very unevenly dispersed among neighborhoods of different income levels and ethnic groups. In California, Black and Hispanic neighborhoods only have 0.7 times the access to public charging infrastructure as the no-majority reference group. Whereas, when controlled for income, proximity to the nearest highway, and multi-family housing, White-majority census block groups were 1.5 times more likely to have access to public chargers than Black and Latino-majority census blocks.<sup>lxxviii</sup>

In sum, access to permanent charging infrastructure is unequal among different income and ethnic groups. Customers from low-income and underserved groups face significant barriers both in terms of costs and access, creating additional challenges for scaling up EV ownership among these groups and unlocking related environmental and social benefits of EVs.

### **Threat of Gentrification**

In our consultations with environmental justice groups, the threat of gentrification emerged as one of the concerns around permanent charging infrastructure. Although investment in charging infrastructure should be equitable, placing equipment in places where there is no demand for it due to lack of EV ownership in specific locations can be classified as gentrification and imposition of interest of others without understanding the community needs.

The availability of Booster mobile solutions can help decrease the risk of gentrification. As the Booster model follows the demand for charging using the requests on the app and establishing partnerships with businesses and landlords, it can help identify communities that require EV charging now, avoiding potential gentrification.

### **EV in Shared-Use Mobility Programs**

An increase in the deployment of EVs for shared-use mobility programs run by TNCs, such as ride-sharing and ride-hailing, can help bring the benefits of clean transportation to large sections of the population, including low-income groups and underserved communities. Lower-income customers may have limited access to personal vehicles and often rely on shared mobility services to perform daily activities. This option can reduce riders' costs associated with vehicle ownership, which is essential for low-income consumers. Shared mobility services provide solutions for last-mile delivery or locations away from major transportation corridors and public transit nodes, such as metro or bus stations in the suburban areas. Transition to EV fleet among shared mobility services can help capture both economic and environmental benefits of such services.<sup>lxxix</sup>

Carsharing companies also electrify their fleets and switch business models to incorporate environmental justice concerns. In Boston, Good2Go provides an EV carshare program with a sliding scale rate to provide affordable clean transportation options for historically Black neighborhoods.<sup>lxxx</sup> In Los Angeles, BlueLA (Blink Mobility) started a pilot EV car sharing in low-income communities in 2018.<sup>lxxxi</sup> The Los Angeles municipal government also partnered with EVgo to provide public-rideshare EV fast-charging hubs exclusively for Maven, General Motors' ride-sharing service (the service was shut down).<sup>lxxxii</sup> Although these specific programs already have permanent charging infrastructure options available for their customers, a partnership with Booster can help expand their service areas without investing in additional EV charging infrastructure. If carsharing companies provide parking options in neighborhoods without chargers, which are likely to be low income and underserved - charging deserts - Booster can deliver electric charge at specific periods when the usage of cars is the lowest. It can take away the burden from the consumer to find the charger or wait for the vehicle to charge.

### **Impact of Electrification of Ride-sharing Services on Drivers**

The electrification mandate for ride-sharing services in CA by 2030 and TNCs' plans to electrify their fleets across the country will put significant pressure on contracted TNC drivers. Other states are likely to follow such legislation as in California across the country in the next few years. The question remains as to who will pay for the transition, as the yearly costs for the transition will reach \$400 million in 2030.<sup>lxxxiii</sup> Although a decrease in fuel and maintenance costs will be even larger, potentially creating net benefits of \$215 million in 2030, neither TNCs, drivers, or governments want to take on the responsibility for covering the high upfront costs of the transition.<sup>lxxxiv</sup>

There is little information on the average income of drivers, making it difficult to assess which income groups will be the most affected.<sup>lxxxv</sup> Average Uber driver-partners hourly earnings are \$19, twice as high as the national minimum wage, but statistics may vary significantly by geographic location.<sup>lxxxvi</sup> For at least a third of Uber driver-partners, ride-hailing is the only personal source of income, and for another third, it is a significant source of personal income.

Uber rolled out an electrification strategy that includes a \$1 zero-emission incentive for EV rides. It also partners with EV manufacturers and car renting agencies to provide vehicle discounts and offers for Uber partner drivers.<sup>lxxxvii</sup> In terms of charging, it provides incentives for EVgo fast-charging stations usage and partnered with Enel X to provide \$125 in savings for EV charging packages.<sup>lxxxviii</sup>

Many drivers are likely to live in rented housing or multi-family dwellings without access to individual charging stations, especially in an urban location where ride-hailing services are popular. This will make them rely on the publicly-provided infrastructure and put constraints on the number of trips provided due to the need to find charging infrastructure and spend longer charging the vehicle versus refueling it with gas. It may prevent drivers from providing services in "charging deserts," - locations with limited charging infrastructure availability usually located in underserved and low-income communities.

Booster can help drivers by providing services in locations with limited charging options. It can also partner with ridesharing companies to offer services at discounted rates for their drivers.

## **6.5. Trends and Challenges in Electricity and EVs**

### **Campus Charging Challenge**

Parking lots adjacent to retail locations, governmental buildings, offices, university campuses, and other locations attracting large numbers of people today are often equipped with EV charging infrastructure.

However, most sites have enough chargers to simultaneously charge two to four cars. Therefore, after the vehicle is charged, the vehicle owner needs to move it to allow others to access the infrastructure. However, this can be inconvenient for drivers to do in the middle of the day during work. This deters drivers from the use of public charging infrastructure.

Our conversations with EV charging experts also revealed that the permitting process for permanent charging infrastructure can be complicated due to specific dimensional, fire safety, utility connection, and other requirements. This prevents many managers of parking lots from installing permanent charging infrastructure.

Booster mobile charging options can provide a solution for both of these challenges. If campus parking lots have several designated parking spaces for Booster users, Booster can charge cars throughout the workday without the need for employers to move their vehicles. Moreover, a mobile solution can simplify the permitting process as it will not need to install permanent infrastructure and will not require access to the power line.

### **Increase in Permanent Infrastructure Signifies a Closing Opportunity**

Current legislation and funding push for permanent charging infrastructure is likely to significantly increase access to EV chargers across all communities in the country. Moreover, other stakeholders in the industry, including utilities, may enter the market at a large scale providing a higher level of competition. Therefore, Booster mobile solutions might lose their attractiveness once EV charges become available everywhere. This can be an opportunity to be utilized in the short and medium term to gain market share.

## **6.6 Recommendations**

EV charging represents a potential market for Booster. The recommendations presented below assume the deployment of proper mobile charging equipment, such as Blink. Moreover, aggressive investment into permanent charging infrastructure at local, state, and federal levels might shrink the opportunity for Booster solutions, making this a short to medium-term priority. Some recommendations incorporate environmental justice principles, whereas others identify general market expansion options.

### **Provide EV charging for multi-family dwellings**

Booster can partner with landlords and real estate management companies to provide EV charging on-premises in the evening and during nighttime for residents. Such a solution offers benefits for all parties. Landlords that do not have EV charging infrastructure, a parking lot with large enough dimensions to install equipment, or a resilient enough grid electricity connection can use this as a solution to attract climate-conscious customers as well as comply with Right-to-Charge laws. (Maryland). For people living in rental housing, there is little incentive to invest in the EV charging infrastructure for themselves, as equipment and installation costs might outweigh the benefits if they intend to move.

Suppose the premises do not provide any charging opportunities or are not enough to accommodate a significant number of dwellers without the need for car rotation. In that case, this can become a deterrent for switching to EVs or for EV owners to moving into apartment complexes. The availability of the Booster mobile solution on the premises can solve this problem.

For Booster, providing charging on-premises will make it easier to increase the number of customers they can charge at once in the location, which is beneficial in terms of fueling spending and GHG emissions.

The problems with grid connection and the inability to charge EVs can be especially prevalent in low-income neighborhoods and housing, where less has been invested in upgrading infrastructure.

### **Collaborate with Transportation Network Companies (TNC) to provide chargers to partner drivers**

The recent push in CA and DC to electrify TNC fleets will impact partner drivers who will need to switch to EVs to continue their current line of work. TNCs already collaborate with companies that provide charging and electric vehicles at discounted rates for their partner drivers. However, most focus on permanent charging infrastructure solutions and rebates without providing solutions for drivers living in multi-family dwellings or in similar situations. Booster can partner with TNCs to attract their drivers to participate in mobile solutions.

Moreover, rental and fleet companies currently provide car rental services for drivers who want to switch to EV services but do not own a vehicle. In this situation, drivers are unlikely to have EV chargers installed in their homes, and Booster can help in those situations.

### **Partner with charging for carsharing fleets**

Compared to individual car ownership, carsharing companies are ahead of the curve in adopting EVs. Carsharing services are also widely utilized by lower-income customers who do not own personal vehicles. The transition of carsharing fleets to EVs can be accelerated if Booster provides mobile charging. The current process of permitting EV charging stations can take a long time, and infrastructure might not be available in all locations, especially in underserved communities. If the carsharing company does not provide enough chargers to rise to the demand, the Booster mobile charging solution will help the driver without waiting for the company-supplied charger to open up.

Partnering with Booster can help carsharing companies expand their service coverage areas without the need to install a permanent EV charging infrastructure. If carsharing companies provide parking options in neighborhoods without chargers, which are likely to be low income and underserved (charging deserts), Booster can deliver electric charge at specific periods when the usage of cars is lowest.

### **Deliver charging solutions for corporate campus and retail fueling**

This recommendation is based on the model used by Booster for conventional fuels. Smaller retail locations might want to provide charging services for customers and employees but may encounter obstacles due to permitting or potential relocation. These conditions would not justify investment in permanent infrastructure, but mobile solutions can work.

Moreover, corporate campuses often install a few permanent charging spots, requiring customers to move their vehicles throughout the day to allow for others to utilize the service. This decreases the desire for customers to use this service. The mobile solution can charge many cars at a time without the need to move cars or the owner's presence during the workday.

### **Test location for permanent EV charging locations**

This solution is based on the proposed pilot at Arizona State University, which was not approved and completed. To maximize the number of customers using permanent EV chargers, it is important to position chargers in a convenient location for the highest share of drivers, is on the way to the main points of destination for customers, and does not impede the flow of traffic. The permitting process can be time-

consuming, and installation costs rise high, so testing of locations for companies installing permanent EV chargers is essential.

Booster can collaborate with local municipal governments or private companies to station trucks at specific locations during the day to test whether the sites would be convenient for customers and utilized enough to justify installation of a permanent charging point.

### **Electrify last-mile transportation options**

Booster can station its charging trucks in transportation nodes, such as metro or bus stops, in suburban areas. Many people drive their cars or utilize carsharing services to get to the metro or bus station parking lot and then shift to public transport to commute into the city centers. Booster can partner with public service providers, who manage the parking lots, to charge cars while their owners work. Such parking lots might already supply some permanent chargers, but Booster can charge more cars without investing in more chargers. Public transport use decreases overall emissions, and electrifying last-mile commute for customers will further increase environmental benefits.

### **Collaborate with emergency service providers for EVs**

Range anxiety remains one of the top reasons people prefer not to switch to EVs. AAA roadside assistance services need to apply their model to EVs in emergencies, such as lack of battery charge. Booster can partner with AAA to provide roadside assistance for EVs, or Booster can deliver a similar service by itself.

Booster relies on the high concentration of customers in a specific geographic location to decrease its service costs, so it might be necessary to limit roadside assistance service coverage to areas where the main customer groups are already located. Previous sections mentioned that low-income neighborhoods usually have a lower EV charging infrastructure penetration so such locations might have a higher need for this service.

### **Provide charging to off-road construction equipment**

As construction companies electrify their fleets of off-road equipment, Booster can provide mobile charging at construction sites that lack access to permanent charging infrastructure or stable current. This would help construction companies access sites further out from their charging stations without the need to bring back their fleets.

## **7. Evaluation Framework**

### **7.1 Overview**

We developed an analytical Evaluation Framework to test our recommendations for each Booster product for feasibility and impact on the energy transition and environmental justice in each geographical market of our analysis. The Evaluation Framework is based on the team's research and analysis presented in the previous sections and helps to quantify the impact of the recommendations. It feeds into the Decarbonization Strategy and prioritizes actions for Booster..

The metrics developed are:

- **Regulatory and policy environment:** whether the regulations and policies necessary for the implementation of the recommendation are in place, what amendments are required, and likelihood of adoption.
- **Technological readiness and infrastructure capacity:** whether there are any technological barriers to implementation of recommendations, whether any additional technology and infrastructure characteristics are required to launch certain Booster services.
- **Business readiness:** whether there were any previous similar engagements in other markets, presence of readily available partners in the market, is it an expansion of a previous offering or a new solution.
- **Impact on the energy transition and environmental justice:** whether our recommendations are in line with the decarbonization transition and whether they contribute to environmental justice.
- **Scalability and profitability:** whether our recommendations are profitable for Booster’s business and whether they are easily launched in other markets.

Each metric (except for impact on the energy transition and environmental justice) is evaluated on a five-point system:

<b>5</b>	Most conducive to development, there are significant opportunities and incentives for implementing the recommendation
<b>4</b>	There are some incentives and opportunities for implementation
<b>3</b>	Neutral, there are no impediments for implementation in the market but there are no incentives either
<b>2</b>	Significant barriers to the implementation of recommendation exist
<b>1</b>	Current conditions prevent the recommendations from being implemented

Evaluation system for impact on the energy transition and environmental justice is also based on a five-point scale, but has slightly different definitions as it looks at the impact the recommendation and Booster solutions will have on environmental justice:

<b>5</b>	Extremely positive impacts, is very likely to improve outcomes for environmental justice
<b>4</b>	Slight positive impact
<b>3</b>	No impact or impact is ambiguous
<b>2</b>	Slight negative impact
<b>1</b>	Extremely negative impact, will deteriorate conditions for some groups in terms of environmental justice, do not pursue this recommendation

The tables are color-coded to ease the understanding of the impacts. Points are summed for each recommendation in the market to provide a quantitative comparison between opportunities.

## 7.2 Evaluation Framework Results

Each table below presents the results of the evaluation for each market. More details about the reasoning behind the scoring for each market can be found in Annex 4. Results and analysis are included in the Decarbonization Strategy in the next Section.

<b>Federal Market</b>	<b>Regulatory and policy environment</b>	<b>Technological readiness and infrastructure capacity</b>	<b>Business readiness and profitability</b>	<b>Impact on the energy transition and environmental justice</b>	<b>Scalability of the technology</b>	<b>Total</b>
<b>Conventional Fuels</b>						
Form partnerships with TNCs and car sharing services	2	5	2	4	5	18
Mobile fueling of cars parked during the day at mobility hubs and other public transport connecting points and metro centers	4	5	5	5	5	24
Serve paratransit, on-demand public transit and microtransit, university and school shuttles	2	5	2	5	5	19
<b>Biofuels</b>						
Support heavy duty vehicles at marine ports of entry	2	4	3	4	3	16
Support heavy duty vehicles at land ports of entry	3	4	3	4	3	17
Support heavy duty vehicles at airports	4	4	2	4	3	17
Refuel flex fuel vehicles owned by government entities	3	5	2	2	4	16
Provide campus refueling service for light duty flex fuel vehicles	2	4	2	3	2	13
<b>Electric Charging</b>						
Provide EV charging for multi-family dwellings	3	2	2	4	4	15
Collaborate with Transportation Network Companies (TNC) to provide chargers to partner drivers	3	2	2	4	2	13

Partner with charging for carsharing fleets	3	2	3	4	3	15
Deliver charging solutions for corporate campus and retail fueling	2	2	3	3	3	13
Test location for permanent EV charging locations	4	2	4	3	2	15
Electrify last mile transportation options	3	2	3	3	3	14
Provide charging for off-road construction equipment	3	1	1	3	4	12
Collaborate with emergency service providers for EVs	3	2	2	3	3	13

<b>California</b>	<b>Regulatory and policy environment</b>	<b>Technology readiness and infrastructure capacity</b>	<b>Business readiness and profitability</b>	<b>Impact on the energy transition and environmental justice</b>	<b>Scalability of the technology</b>	<b>Total</b>
<b>Conventional Fuels</b>						
Form partnership with TNCs and car sharing services	2	5	2	4	5	18
Mobile fueling of cars parked during the day at mobility hubs and other public transport connecting points and metro centers	2	5	4	4	5	20
Serve paratransit, on-demand public transit and microtransit, university and school shuttles	2	5	3	4	5	19
<b>Biofuels</b>						
Support heavy duty vehicles at marine ports of entry	5	4	3	5	4	21
Support heavy duty vehicles at land ports of entry	4	4	2	3	3	16
Refuel flex fuel vehicles owned by government entities	4	4	4	2	4	18
Provide campus refueling service for light duty flex fuel vehicles	2	4	2	3	2	13
<b>Electric Charging</b>						
Provide EV charging for multi-family dwellings	4	2	2	4	4	16
Collaborate with Transportation Network Companies (TNC) to provide chargers to partner drivers	5	2	2	4	3	16

Partner with charging for carsharing fleets	4	2	3	4	3	16
Deliver charging solutions for corporate campus and retail fueling	4	2	4	3	3	16
Test location for permanent EV charging locations	3	2	4	3	2	14
Electrify last mile transportation options	2	2	4	3	2	13
Provide charging for off-road construction equipment	4	1	1	3	4	13
Collaborate with emergency service providers for EVs	3	2	2	3	3	13

	<b>Regulatory and policy environment</b>	<b>Technology readiness and infrastructure capacity</b>	<b>Business readiness and profitability</b>	<b>Impact on the energy transition and environmental justice</b>	<b>Scalability of the technology</b>	<b>Total</b>
<b>D.C. / Maryland</b>						
<b>Conventional Fuels</b>						
Form partnership with TNCs and car sharing services	3	5	1	4	5	18
Mobile fueling of cars parked during the day at mobility hubs and other public transport connecting points and metro centers	3	5	3	4	5	20
Serve paratransit, on-demand public transit and microtransit, university and school shuttles	3	5	3	4	5	20
<b>Biofuels</b>						
Support heavy duty vehicles at marine ports of entry	2	4	2	3	3	14
Refuel flex fuel vehicles owned by government entities	2	4	2	3	4	15
Provide campus refueling service for light duty flex fuel vehicles	2	4	2	3	3	14
<b>Electric Charging</b>						
Provide EV charging for multi-family dwellings	4	2	2	4	4	16

Collaborate with Transportation Network Companies (TNC) to provide chargers to partner drivers	3	2	3	4	3	15
Partner with charging for carsharing fleets	3	2	3	4	3	15
Deliver charging solutions for corporate campus and retail fueling	4	2	4	3	3	16
Test location for permanent EV charging locations	3	2	4	3	2	14
Electrify last mile transportation options	3	2	4	3	2	14
Provide charging for off-road construction equipment	3	1	1	3	4	12
Collaborate with emergency service providers for EVs	3	2	2	3	2	12

<b>Washington</b>	<b>Regulatory and policy environment</b>	<b>Technology readiness and infrastructure capacity</b>	<b>Business readiness and profitability</b>	<b>Impact on the energy transition and environmental justice</b>	<b>Scalability of the technology</b>	<b>Total</b>
<b>Conventional Fuels</b>						
Partnership with TNCs and car sharing services	3	5	1	4	5	18
Mobile fueling of cars parked during the day at mobility hubs and other public transport connecting points and metro centers	4	5	4	4	5	22
Serving paratransit, on-demand public transit and microtransit, university and school shuttles	3	5	3	4	5	20
<b>Biofuels</b>						
Support heavy duty vehicles at marine ports of entry	5	4	4	5	4	22
Supporting Heavy Duty Vehicles at Land Ports of Entry	5	4	2	2	4	17
Refueling flex fuel vehicles owned by government entities	5	4	5	2	4	20
Providing campus refueling service for light duty flex fuel vehicles	3	4	3	3	3	16
<b>Electric Charging</b>						
Provide EV charging for multi-family dwellings	2	2	3	4	4	15
Collaborate with Transportation Network Companies (TNC) to provide chargers to partner drivers	3	2	3	4	3	15
Partner with charging for carsharing fleets	3	2	3	4	3	15
Deliver charging solutions for corporate campus and retail	4	2	4	3	3	16

fueling							
Test location for permanent EV charging locations	3	2	4	3	2	14	
Electrify last mile transportation options	3	2	4	3	2	14	
Provide charging for off-road construction equipment	3	1	1	3	4	12	
Collaborate with emergency service providers for EVs	3	2	2	3	2	12	

## 8. Decarbonization Strategy

This Section provides a comprehensive overview of ways Booster can expand current offerings and capture new market opportunities while incorporating decarbonization and pillars of environmental justice in its activities. Based on the analysis and the Evaluation Framework, the Decarbonization Strategy includes the highest-scoring recommendations for four markets and fuel types and illustrates a potential roadmap that allows Booster to leverage its MFOD business model to support a decarbonization transition and, in particular, address the needs of under-served communities as part of a “just” transition. The tables below outline all recommendations evaluated in the Report. Those that scored highest in the Evaluation Framework for each market are marked with a check (✓), signifying the most promising area for expansion.

### 8.1 Conventional Fuels Recommendations

Concerning conventional fuel delivery, we would recommend Booster focus on mobile fueling of cars at mobility hubs and transportation nodes and serving paratransit, on-demand public transit, and microtransit. This can support “just transition” by decreasing consumers’ time spent on fueling cars at gas stations, increasing access to mobility, diminishing the demand for gas stations in the long term, cutting fuel and other costs for consumers, and contributing to the decarbonization of the transportation sector overall. Mobility hubs also improve air quality for communities located in the traditional “red urban” zones.

These recommendations rely on the current technology and equipment and do not require a significant change in the business model for Booster. We do not identify crucial regulatory barriers that would prevent Booster from entering this segment. These opportunities are approximately equal in California, DC/ Maryland, and Washington. Therefore, they can be implemented in the short to medium term once potential partnerships are identified. In the long-term, once the closure of gas stations becomes more prevalent across the country, Booster’s MFOD services can gain even more traction.

Conventional Fuels	Markets			
	Federal Level	California	DC/Maryland	Washington
Recommendations:				
Form partnerships with TNCs and car-sharing services				
Fuel of cars parked during the day at mobility hubs and other public transport connecting points and metro centers	✓	✓	✓	✓
Serve paratransit, on-demand public transit, and microtransit, university, and school shuttles	✓	✓	✓	✓

### 8.2 Biofuels Recommendations

The market for distribution of biofuels through the MFOD business model is limited to a smaller subset of vehicles. Thankfully for Booster’s MFOD model, refueling can be accomplished without costly refitting of tankers. The fixed costs associated with expanding biofuel distribution are associated with reallocation

of the existing tanker fleet, rather than procurement of technologically distinct tanker infrastructure. This means that the biofuels market is within reach at low risk and low cost to Booster.

The biofuels market is challenging. Switching to biofuels delivers major environmental benefits, but most policies prioritize electrification, leaving little room for biofuel vehicles. Booster should focus on Washington State, as it is most conducive to the business, followed by the federal level and California. The DC/Maryland regulatory environment makes it difficult for Booster to enter the market.

Booster should prioritize supporting heavy-duty vehicles at marine and land ports of entry, with a particular emphasis on refueling flex vehicles owned by government entities.

Biofuels	Market			
	Federal Level	California	DC/Maryland	Washington
Recommendations:				
Support heavy duty vehicles at marine ports of entry	✓	✓		✓
Support heavy duty vehicles at land ports of entry	✓			✓
Support heavy duty vehicles at airports				✓
Refuel flex fuel vehicles owned by government entities	✓	✓		

### 8.3 Electric Charging Recommendations

In terms of electric charging, the MFOD business model holds many opportunities with the current push for transportation electrification and potential to unlock positive benefits for underserved communities. However, technological limitations still exist, as the Booster pilot showed, making many recommendations unfeasible in the short term. At the same time, Booster needs to capitalize on the current uneven and unequal distribution of permanent electric charging equipment that helps to both increase the business opportunities and prioritize environmental justice through the delivery of service in “charging dessert.”

Right-to-Charge laws in Maryland and California obligate landlords to allow the installation of chargers in parking lots in rental units and condominiums. This option is not very enticing for renters if they plan on moving, so a Booster mobile solution can be applied. This can also help landlords provide charging and attract EV owners if the building does not allow for the installation of permanent charging infrastructure on-premises due to problems with utilities, dimensions of the parking lot, and others. For Booster, it can unlock areas with high customer penetration residing in multi-family buildings, which is essential for the model to be profitable.

California policies, and especially the mandate to electrify TNC fleets by 2030, can push TNCs to partner with Booster to support their drivers in the transition towards EVs, especially if they lack permanent charging infrastructure in their living spaces. DC/Maryland adopted a less stringent transition plan, but it might be a possible area of market expansion. Booster should capitalize on this opportunity by collaborating with the TNCs and providing services to drivers with TNCs providing a potential discount. This solution can support environmental justice by electrifying ride-hailing services that are used by all

income levels, especially those without access to personal vehicles. It will also support drivers and decrease costs for EV transition by taking away the need to install permanent EV chargers.

Booster can also apply the model used in conventional fueling by providing charging at corporate and university campuses and retail locations. Current permanent chargers usually can provide service to the maximum of two vehicles at once, meaning that if the demand is higher, vehicle owners need to move away their cars during the workday. Booster solution will solve this problem.

Electric Charging	Market			
	Federal Level	California	DC/Maryland	Washington
Recommendations:				
Provide EV charging for multi-family dwellings		✓	✓	
Collaborate with Transportation Network Companies (TNC) to provide chargers to partner drivers		✓		
Partner with charging for carsharing fleets				
Deliver charging solutions for corporate campus and retail fueling		✓	✓	✓
Test location for permanent EV charging locations				
Electrify last mile transportation options				
Provide charging for off-road construction equipment				
Collaborate with emergency service providers for EVs				

#### 8.4 General Recommendations

More general recommendations that can help bolster Booster business and be applied regardless of fuel and market are outlined below:

##### **Advertise and promote education programs aimed to increase public awareness of the MFOD business model**

Scaled-up advertising and promotion of the Booster’s MFOD business model together with education programs for corporate clients and state and municipal authorities represent a growth opportunity. An increase in public awareness is crucial, especially for grass-roots initiatives of environmental justice groups, advocating for small-scale solutions for local communities.

##### **Continue to work with regulatory authorities to amend legislation originally designed for traditional fueling methods and adapt it for mobile fueling**

As described in this Report, further expansion of the MFOD business model is limited by stringent provisions of fire codes and GHG standards, such as certification of mobile fueling equipment, licensing of the operation, approval of mobile fueling sites. Booster can work with federal, state, and municipal authorities to refine such policies and regulations in a way that is beneficial for environmental justice and

the energy transition purposes, and at the same time better understands the essence of mobile fueling technology and allows Booster to implement its model at a broader scale.

# Annex 1. Regulations and Policies Related to Conventional Fuels

## Federal Level

[Specification by the Federal Department of Transportation 406; cargo tank motor vehicle. 49 CFR 178.346; cargo tank motor vehicle \(2011\)](#)

This specification sets tanker truck requirements, including those applicable to mobile fueling tanker trucks.

[Specification by the Federal Department of Transportation 406; cargo tank motor vehicle. 49 CFR 178.346; cargo tank motor vehicle \(2011\)](#)

This federal rule sets hazardous material transportation requirements. Operators of gasoline and diesel tanker trucks shall obtain certificates of registration from the Department of Transportation.

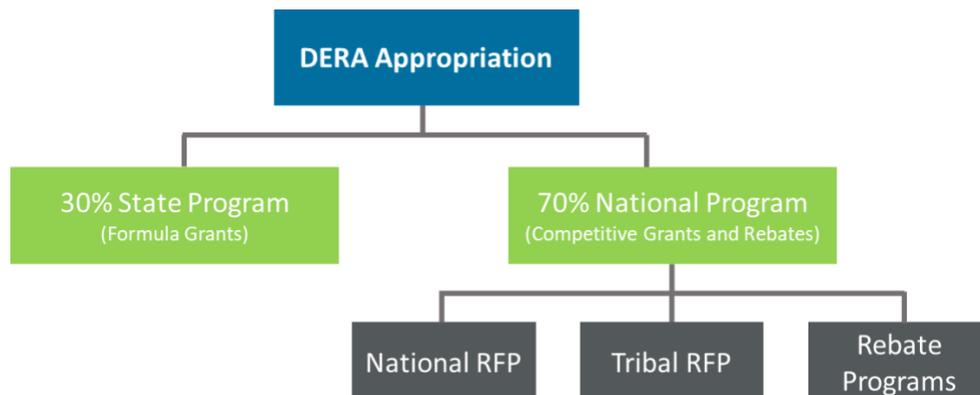
[Environmental Protection Agency 40 CFR § 112.1 - General applicability \(2011\)](#)

This EPA’s rule sets spill prevention requirements. Operators shall create spill prevention plans and train employees accordingly.

[Diesel Emissions Reduction Act \(DERA\)](#)

For the existing diesel engines that are expected to operate for another 30 years or more, under the Energy Policy Act of 2005, the EPA has the authority to give grants and loans for promoting diesel emission reductions and authorized appropriations to the Agency of up to \$200 million every year through the Diesel Emissions Reduction Act Program (DERA) till 2011. In 2011, DERA grants were reauthorized to eligible entities for projects that reduce emissions from existing diesel engines through 2016. DERA has continued to award grants and rebates as it was reauthorized under Division S - Innovation for the Environment section of the Consolidated Appropriations Act, 2021 for up to \$100 million annually through 2024.

Considering the larger negative impact of diesel exhaust from buses on children, whose lungs are not yet fully developed and breathe faster than adults do, DERA has offered rebates for school buses, amounting to approximately \$10 million to public and private fleet owners for the replacement of old diesel school buses with new buses certified to EPA’s cleanest emission standards.



### Heavy-Duty National Programs (2010 - 2016)

During President Obama’s second term of administration, the EPA and the Department of Transportation’s National Highway Traffic Safety Administration (NHTSA) announced a first-ever comprehensive Heavy-Duty National Program to reduce greenhouse gas (GHG) emissions and improve fuel efficiency for medium- and heavy-duty vehicles in 2010. The final standards published in 2016 are expected to lower CO2 emissions by approximately 1.1 billion metric tons, save vehicle owners fuel costs of about \$170 billion, reduce oil consumption by up to 2 billion barrels over the lifetime of the vehicles sold under the program. The Phase 2 standards did not foresee the accelerating entry of zero-emission heavy-duty trucks.

### Clean Trucks Plan (2021)

Recognizing the significant air pollution caused by heavy-duty trucks and buses across the country, especially the disproportionately affected communities of color and low-income populations, EPA announced the “Clean Trucks Plan” in 2021. The Plan is to propose new stringent GHG emissions standards and standards to reduce nitrogen oxides (NOx) pollution from trucks starting in the model year 2027.

### American Rescue Plan (ARP)

In addition to the DERA, the American Rescue Plan Act of 2021 (ARP) appropriated funds to the EPA for “activities that identify and address disproportionate environmental or public health harms and risks in minority populations or low-income populations”. The 2021 ARP Electric School Bus Rebate offers \$7 million to eligible underserved school districts, tribal schools, and private fleets serving those schools.

### Volkswagen Environmental Mitigation Trust

Under the settlement between the U.S. government and Volkswagen (VW) after VW violated the Clean Air Act by selling approximately 590,000 vehicles equipped with defeat devices, VW is required to provide approximately \$3 billion to remediate the excess NOx emissions from the affected vehicles. All 50 states, the District of Columbia, Puerto Rico, and federally recognized Tribes are eligible to become beneficiaries.

One of the initiatives is the SuperTruck Program since 2010, which is initiated by the DOE, to which DOE’s Vehicle Technologies program provided matching funds. By collaborating with companies, national laboratories, and universities, this program has been developing highly efficient and clean diesel engines for freight efficiency.

## **California**

### [California State Fire Marshal, “California Fire Code Chapter 57 Matrix Errata,” Information Bulletin 18-004, March 20, 2018](#)

Main topic: adoption of on-demand mobile fueling in California (section 5707). Local fire officials in California have the discretion to adopt rules for mobile-fueling companies’ operations.

### Air Pollution Control Fund

CARB and EPA continued to perform enhanced screening on diesel vehicles sold by all manufacturers to detect “defeat devices” in diesel vehicles that are designed to control emissions during certification and

vehicle testing. CARB has so far identified two additional manufacturers that used defeat device software resulting in additional NOx emissions from subject vehicles. The two enforcement settlements with Fiat Chrysler (FCA) and Mercedes-Benz (Daimler) appropriated a combined \$129.035 million in the Budget Act of 2021 to expand existing incentive projects that can mitigate NOx impacts. Specifically, the State budget included \$86.45 million to support clean trucks, buses, and off-road equipment through the Clean Transportation Incentives Funding Plan, and the remaining funds are appropriated to augment the Funding Agricultural Replacement Measures for Emission Reductions (FARMER) Program.

*“Greenhouse Gas Standards for Medium- and Heavy-Duty Engines and Vehicles,” California Air Resources Board<sup>lxxxix</sup>*

Regulation of vapor management equipment: Phase I systems for mobile fuel handling equipment and Phase II systems for stationary fuel transfers. CARB’s greenhouse gas (GHG) standards substantially align with the U.S. Environmental Protection Agency (EPA) and the National Highway Traffic Safety Administration (NHTSA) GHG standards for new medium- and heavy-duty engines, vehicles, and trailers sold in California. The regulations reduce GHG emissions from on-road medium- and heavy-duty vehicles.

*Low Carbon Transportation*

Since 2013, the Legislature has appropriated a total of over \$2.1 billion to CARB for Low Carbon Transportation projects. These appropriations are being used to fund: zero-emission and plug-in hybrid passenger vehicles through traditional and innovative car ownership projects such as the Clean Vehicle Rebate Project (CVRP), Clean Cars 4 All, and Statewide Financing Assistance; clean mobility investments to increase access to alternative modes of transportation for priority populations; deployment incentives for clean trucks and buses utilizing zero-emission technologies; and advanced technology demonstration projects for freight trucks and equipment.

One of the common environmental needs of priority populations that are addressed by the proposed low carbon transportation investment in 2022 is the need to prioritize zero-emission vehicle projects for areas with “high diesel air pollution, especially around schools or sensitive populations with near roadway exposure.” Investments in low carbon transportation projects provide incentives for zero-emission vehicles to replace diesel vehicles, including Clean Truck and Bus Vouchers (HVIP), Clean Off-Road Equipment Vouchers (CORE), Clean Mobility in Schools Pilot Projects (CMIS), and demonstration and pilot projects.

*Air Quality Improvement Program (AQIP)*

Created in 2007 and has been reauthorized through 2023, AQIP is a mobile source incentive program that focuses on reducing criteria pollutant and diesel particulate emissions with concurrent reductions in GHG emissions, for which primary fundings come from the smog abatement fee assessed annually by the Department of Motor Vehicles (DMV).

*Heavy-Duty Low NOx Omnibus Regulation*

In 2020, CARB approved a multi-pronged regulation named the “Heavy-Duty Low NOx Omnibus Regulation”, which requires manufacturers to comply with tougher emissions standards, overhaul engine testing procedures, and further extend engine warranties to ensure that emissions of NOx (oxides of nitrogen, a key component of smog) are reduced to help California meet federal air quality standards and critical public health goals.

### SB 1403 School Bus Report Updates

The legislature passed SB 1403 in 2018, formalizing the Long-Term Heavy-Duty Investment Strategy and adding to it a report on the State's school bus population and funding needs. The state has spent or allocated nearly \$110 million to school bus cleanup in FY2020-2021 and new fundings continued to be dedicated to turnovers of all publicly owned school buses.

### Proposal of Public Transit Bus Set-Aside

The FY2021-2022 State budget appropriates \$70 million to CARB for zero-emission transit bus incentives, which will be complemented by additional funding for infrastructure to be administered by CEC. These funds are expected to assist public transit fleets to purchase zero-emission buses, including those that were initially on a diesel compliance pathway for the Innovative Clean Transit Regulation.

### Community Air Protection Program (CAPP)

The CAPP was established in response to Assembly Bill (AB) 617 in 2017 to reduce exposure in communities most impacted by air pollution. After selecting an initial 10 communities for community air monitoring and community emissions reduction programs, air districts have been providing annual reports and statewide strategies provided by CARB.

## **Washington**

### Clean Energy Transformation Act (CETA)

In 2019, the Washington State Legislature passed the Clean Energy Transformation Act (CETA), which commits Washington to an electricity supply free of greenhouse gas emissions by 2045. As directed by CETA, the Washington State Department of Health (DOH) developed a cumulative impact analysis (CIA) in order to designate communities highly impacted by climate change and fossil fuel pollution.

The goal of designating highly impacted communities is to highlight communities that are currently experiencing a disproportionate share of environmental risk factors and that must, according to CETA, benefit equitably from the transition to a clean energy economy.

### Motor Vehicle Emission Standards Law and Zero Emission Vehicle Standards

In 2020, the legislature adopted the California motor vehicle emission standards in Title 13 of the California Code of Regulations. The Zero Emission Vehicle Standards updated in 2021 required a certain percentage of vehicles sold in the state to be zero-emission, thus providing more options for zero-emission cars for consumers, starting with the 2025 model year.

### Climate Commitment Act

In May 2021, Governor Jay Inslee signed the comprehensive climate law named Climate Commitment Act (CCA) and established a "cap and invest" program, from which the auction allowances raise funds for climate resiliency agenda including reducing pollution in disproportionately affected communities and expanding clean transportation. The CCA will start in January 2023 and dedicate at least 35% of funds toward overburdened communities.

### Clean Fuel Standard

Starting in July 2021, the Department of Ecology has announced rulemaking for the Clean fuels Program Rule (E3SHB 1091) to curb statewide carbon pollution from transportation by 4.3 million metric tons a year by 2038 and stimulate economic development in low carbon fuel production.

#### Clean Diesel Program

Within the Washington State Department of Ecology's investment in zero-emission technologies, part of which has been dedicated to the promotion of clean diesel and reduction of diesel emissions as nearly 5 million people live or work close to transportation corridors where they are exposed to high levels of diesel exhaust.

The fundings have been prioritizing the electrification of school buses. The Department of Ecology announced the availability of approximately \$10 million in grants in FY2022-2023 to help accelerate the transformation of Washington's diesel powered school bus fleet to an all-electric powered fleet.

#### West Coast Collaborative

The West Coast Collaborative is a voluntary public-private partnership (PPP) committed to reducing diesel emissions and advancing clean technologies throughout the western United States. This collaborative is part of the National Clean Diesel Campaign (NCDC) and is between leaders from federal, state, and local government, the private sector, academia, and environmental groups. EPA launched the Collaborative but does not control the Collaborative, which helps coordinate regional efforts for cleaner fuels and the Clean School Bus USA Program.

#### Exhaust Retrofit Equipment

Along with other clean air agencies, the Department of Ecology has provided fundings for school buses, public fleet vehicles, and garbage trucks in densely populated areas to retrofit their diesel engines.

#### VW Settlements

Volkswagen paid Washington a \$28.4 million settlement for violating the state Clean Air Act. In 2018, the Washington Legislature approved the use of these penalty funds to reduce diesel pollution in communities to benefit children, commuters, and people living near major transportation corridors. Funds are being invested in cleaner school and transit buses, replacing state agency vehicles with all-electric vehicles, helping purchase cleaner trucks, and installing shore power for ocean-going vessels at public ports. Since the receipt of the settlement, the legislature allocated funds in mostly replacing old school buses and adding electric vehicles to state vehicle fleets.

## **Maryland**

#### Diesel Vehicle Emissions Control Program (DVECP)

Maryland Department of the Environment provides technical support and coordination to the multi-agency, state-wide Diesel Vehicle Emissions Control Program. The Program affects any diesel-powered vehicle with a gross combination or gross vehicle weight rating of over 10,000 pounds traveling on Maryland's highways. Enforcement is carried out by the Maryland State Police and the Maryland Transportation Authority Police (MTAP), who can require any heavy-duty diesel vehicle to submit to a smoke emissions test at any time or place.

#### Climate Solutions Now Act

In January 2022, Maryland lawmakers proposed an omnibus bill that sets statewide carbon emission goals and establishes specific actions, expecting to help Maryland in reaching net-zero carbon emissions by 2045 and the interim goal of 60% reduction by 2030.

#### Zero-Emission Vehicle School Bus Transition Grant Program

Chapter 492 of 2019 established the Zero-Emission Vehicle School Bus Transition Grant Program within the Maryland Department of the Environment to provide grants to local boards of education (and entities that contract with local boards to provide transportation services) to (1) purchase school buses that are zero-emission vehicles; (2) install electric vehicle infrastructure for charging school buses that are zero-emission vehicles; (3) engage in planning for a transition to using school buses that are zero-emission vehicles; and (4) fund pilot programs to experiment with a transition to school buses that are zero-emission vehicles.

#### Public Utilities - Electric Bus Pilot Program (HB 832)

Currently, there does not exist an electric school bus pilot program funded through electric utilities, Maryland lawmakers seek to pass a bill to convert the state's nearly 3000 school buses to electric vehicles. Instead of having the school system invest in the electrification of their school bus fleets, this bill proposes conversion costs to fall on statewide investor-owned electrical companies, which will provide rebates to jurisdictions covering any purchasing costs greater than traditional diesel buses. If passed, this process will be effective in 2023.

#### Human Rights Amendments

An amendment to the Maryland Constitution on adding environmental rights to the definition of human rights was brought to the General Assembly for the third time with a phrase: "each person, as a matter of human dignity, has the fundamental and inalienable right to a healthful environment."

#### Rolling Coal Program

In 2017, Maryland Governor Larry Hogan signed the "Rolling Coal" house bill (HB 11) on Thursday to ban the practice of "rolling coal" in which drivers of diesel pickup trucks intentionally spew black exhaust at pedestrians, cyclists, and other motorists. This bill allows law enforcement to cite and fine drivers who engage in rolling coal.

#### Maryland policies and regulations under consideration: Climate Crisis and Environmental Justice Act (HB 171, SB 135)

Democratic delegate from Montgomery, David Fraser-Hidalgo proposed this act to charge carbon fees to fund green infrastructure projects and provide benefits to different households and employers, among which are low- and moderate-income households, and energy-intensive trade-exposed businesses. Another part of the money collected is proposed to go to the Climate Crisis Infrastructure fund to help promote different environmental and climate change policies and initiatives.

#### **Washington D.C.**

#### Clean Energy Omnibus Amendment Act of 2018 (CEDC Act)

As the country's most aggressive and impactful clean energy actions to-date and establishes the District of Columbia as a global leader in the fight against climate change, the Act codifies several key initiatives

identified in the Clean Energy DC Plan (“the Plan”)—the District’s detailed energy and climate action plan to halve greenhouse gas emissions by 2032. The Act establishes 3 initiatives that are determined to help energy transition in the city.

- **Vehicle Excise Tax:** The Act calls for the vehicle excise tax formula to be revised to incentivize electric and fuel-efficient vehicles over less efficient vehicles, with certain provisions to protect low- and middle-income residents.
- **Transportation Electrification Program:** The Act mandates that 100% of public buses, public fleets, private fleets of more than 50 vehicles, and taxis and limousines are to be zero-emission by 2045 (and 50% zero-emissions by 2030). It includes a provision to incentivize the development of electric vehicle charging infrastructure, including the authorization of the Public Service Commission to consider the electric company's application to build infrastructure that promotes the deployment of electric vehicles.
- **Clean Vehicle Transition Plan:** The Act calls for the development of a strategy that includes both policy recommendations and cost estimates to achieve the following: (1) at least 25% of vehicles registered in DC be zero-emission by 2030; (2) 100% replacement of public and school buses to electric public buses upon end of their useful life beginning in 2021; and, (3) implementation of the Mayor’s Transportation Electrification Program.

Community Engine Idling Enforcement Program

The Department of Energy and Environment (DOEE) is initiating a Community Engine Idling Enforcement Pilot Program to test the feasibility of expanding opportunities for District residents to assist in improving air quality. Under the program, community members desiring to report violations of the engine idling regulations will use the District of Columbia 311 Mobile App (DC311 App) to report and submit information about violations in a manner that will allow for civil enforcement of the regulations.

**List of Diesel Emissions Reduction Act (DERA) Programs in California and Washington State**

<b>Agriculture</b>	California	2021	National DERA	<a href="#">Replacing Diesel Agricultural Equipment - San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD)</a>
<b>Freight</b>	California	2021	National DERA	<a href="#">Cajon Valley Unified School District Zero Emission Battery Electric Trucks</a>
<b>Freight</b>	California	2021	National DERA	<a href="#">Reducing Heavy-Duty Truck Emissions in the San Joaquin Valley, CA</a>
<b>Freight</b>	California	2021	National DERA	<a href="#">Replacing a Diesel Switcher Locomotive to a Zero Emissions Switcher Locomotive</a>
<b>Freight</b>	California	2021	National DERA	<a href="#">Electrification of Cargo Handling Equipment – South Coast Air Quality Management District</a>
<b>School Buses</b>	California	2021	State DERA	<a href="#">California Air Resources Board School Bus Replacement</a>
<b>Marine Vessels and Ports</b>	Washington	2020	National DERA	<a href="#">Electrical Terminal Tractors Project - Northwest Seaport Alliance</a>
<b>Marine Vessels and Ports</b>	Washington	2020	State DERA	<a href="#">Lift &amp; Yard Truck Replacement Project - Washington Department of Ecology (WDOE)</a>

<b>Marine Vessels and Ports</b>	Washington	2020	National DERA	<a href="#">Pier 66 Cruise Shore Power Project - Port of Seattle</a>
<b>Marine Vessels and Ports</b>	Washington	2020	Tribal DERA	<a href="#">Marine Diesel Engine Repower Project – Quinault Indian Nation</a>
<b>Marine Vessels and Ports</b>	Washington	2020	Tribal DERA	<a href="#">Phase 5 Marine Engine Repower Project – Swinomish Indian Tribal Community</a>
<b>Trucking</b>	Washington	2020	National DERA	<a href="#">Heavy- and Medium-Duty Truck Replacement Project - Clean Air Construction Collaborative</a>
<b>Agriculture</b>	California	2020	National DERA	<a href="#">Replacing Diesel Agricultural Equipment - San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD)</a>
<b>Marine Vessels and Ports</b>	California	2020	National DERA	<a href="#">Tugboat Electrification Project – Port of San Diego</a>
<b>Multiple Sectors</b>	California	2020	National DERA	<a href="#">Zero-Emission Agricultural Truck Replacements - San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD)</a>
<b>School Buses</b>	California	2020	State DERA	<a href="#">School Bus Replacements - California Air Resources Board (CARB)</a>
<b>Trucking</b>	California	2020	National DERA	<a href="#">Electrification of Transport Refrigeration in Southern California Grocery Fleets NOx Truck Replacements/Trade Up - South Coast Air Quality Management District (SCAQMD)</a>
<b>Marine Vessels and Ports</b>	Washington	2019	State DERA	<a href="#">Tugboat Repower Project - Washington Department of Ecology</a>
<b>Marine Vessels and Ports</b>	Washington	2019	Tribal DERA	<a href="#">Marine Engine Replacement Program (Phase 5) – The Lummi Tribe of the Lummi Reservation</a>
<b>Marine Vessels and Ports</b>	Washington	2019	Tribal DERA	<a href="#">Marine Diesel Engine Repower Project - The Quinault Indian Nation</a>
<b>Marine Vessels and Ports</b>	Washington	2019	Tribal DERA	<a href="#">Marine Engine Repower and Fish Plant Shore Power Project (Phase 4) - The Swinomish Indian Tribal Community</a>
<b>Marine Vessels and Ports</b>	Washington	2019	National DERA	<a href="#">Husky Terminal Shore Power Project - Northwest Seaport Alliance</a>
<b>Public Fleets</b>	Washington	2019	National DERA	<a href="#">Refuse Collection Trucks Replacement Project - City of Tacoma</a>

<b>Agriculture</b>	California	2019	National DERA	<a href="#">Replacing Diesel Agricultural Equipment - San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD)</a>
<b>Locomotive and Rail</b>	California	2019	National DERA	<a href="#">Switcher Locomotive Replacements - San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD)</a>
<b>Marine Vessels and Ports</b>	California	2019	National DERA	<a href="#">Hybrid Rubber-Tired Gantry Crane Replacements - City of Long Beach, Harbor Department's (COLBHD)</a>
<b>Multiple Sectors</b>	California	2019	Tribal DERA	<a href="#">School Bus and Backhoe Replacements – Morongo Band of Mission Indians</a>
<b>Multiple Sectors</b>	California	2019	National DERA	<a href="#">Zero-Emission Agricultural Truck Replacements - San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD)</a>
<b>Public Fleets</b>	California	2019	Tribal DERA	<a href="#">Wildland Fire Engine Replacement - Blue Lake Rancheria</a>
<b>School Buses</b>	California	2019	State DERA	<a href="#">School Bus Replacements - California Air Resources Board (CARB)</a>
<b>Trucking</b>	California	2019	National DERA	<a href="#">Low NOx Truck Replacements/Trade Up - South Coast Air Quality Management District (SCAQMD)</a>
<b>Multiple Sectors</b>	Washington	2018	State DERA	<a href="#">School and Transit Bus Retrofit and Replacement Program - Washington Department of Ecology</a>

## Annex 2. Regulations and Policies Related to Biofuels

### Federal Level

#### Executive Order 14009 “Tackling the Climate Crisis at Home and Abroad”:

In the first week of President Biden’s Administration, the President announced a policy of enhanced action to “avoid the most catastrophic impacts of [the climate crisis] and to seize the opportunity that tackling climate change presents.” One major component of this Executive Order was to direct the heads of agencies to identify any fossil fuel subsidies provided by respective agencies and then to eliminate all fossil fuel subsidies from the budget request for the Fiscal Year 2022 and thereafter (Sec. 209). According to one [study](#), “direct subsidies to the fossil fuel industry totaled \$20 billion per year, with 80% going toward oil and gas.” Not all of those subsidies originated from the Federal budget, but it would be reasonable to assume that a complete cessation of Federal subsidies for fossil fuels will lead to increased consumer costs for fossil fuel products. This policy will likely have some negative impact on the total cost of business for the MFOD business model but could incentivize enterprises transitioning to biofuel fleets if the cost of biofuels increases at a lower magnitude than comparable petroleum products.

#### Executive Order 14037 “Strengthening American Leadership in Clean Cars and Trucks:”

President Biden announced a policy to “improve our economy and public health, boost energy security, secure consumer savings, advance environmental justice, and address the climate crisis.” The major priority of this policy is to set a goal that 50 percent of all new passenger cars and light trucks sold by 2030 be zero-emission vehicles. The President has directed the Administrator of the EPA and the Secretary of Transportation to generate new rules to govern fuel economy and multi-pollutant standards under the authorities of the **Clean Air Act** and the **Energy Independence and Security Act**. These new fuel standards will be published over the course of several years to ultimately impact vehicles manufactured with the model year 2027 and extending through at least the model year 2030.

The impact of this policy objective will not be clear until the publication of the new rules, so for now the implications for the MFOD business model are ambiguous. On one hand, the prioritization of positive environmental justice outcomes will likely lead to more stringent carbon intensity restrictions. This kind of regulatory pressure on car manufacturers may incentivize them to produce vehicles that are capable of consuming biofuels as the carbon intensity is significantly lower than conventional petroleum-fueled ICE. Alternatively, since the stated goal is a complete market transition to zero-emission vehicles, the regulatory pressure may cause manufacturers to invest heavily in the development of EV and hydrogen fuel cell vehicles. This kind of market reorientation would dramatically limit the potential for new biofuel MFOD clients over the next ten years. Clarity on this position will come when rules are released by the relevant department heads in the coming months.

#### Clean Cities Coalition Network

The U.S. Department of Energy administers a program called the Clean Cities Coalition Network that provides support services for cities and municipalities that have opted into a renewable energy transition. Many of the cities within the Clean Cities Coalition Network are relevant to the Booster regions of operation including Sacramento, Oakland, San Francisco, San Jose, Los Angeles, Long Beach, San Diego, Western Washington including Seattle, and the Greater Washington D.C. Region. Booster could potentially benefit from a partnership with the [Clean Cities Coalition Network](#) as the program's centralized distribution of resources could provide a starting point for a new business and environmental justice partnership.

### Ports Initiative - United States Environmental Protection Agency

The five major West Coast ports in the United States lie within reach of the Booster area of operation: the Ports of Seattle and Tacoma, the Port of Oakland, and the Ports of Los Angeles and Long Beach. The [EPA](#) has created an incentive-based program designed to reduce emissions by “encouraging port authorities and terminal operators to retrofit and replace older diesel engines with new technologies and use cleaner fuels.” Ports offer a potentially creative opportunity for Booster to expand its customer base since the operational infrastructure is constrained within a finite geographic area and Booster could provide a competitively priced service that reduces emissions versus competition.

### Voluntary Airport Low Emissions (VALE) Program

The Federal Aviation Administration created a program to reduce the carbon footprint of airports across the country. Through the [VALE](#) program airport administrators have access to funds to “finance low emission vehicles, refueling and recharging stations, gate electrification, and other air quality improvements.” According to the VALE program grant summary, airports within this Report's Scope of Work have already participated in this program to the magnitude of millions of dollars for infrastructure improvements. Baltimore Washington International, Los Angeles International, San Diego International, San Francisco International, Seattle-Tacoma International, Spokane International, Washington Reagan, and Washington Dulles have all received [FAA](#) funding for low-emission infrastructure projects. There is a potential to partner with airports in order to provide their infrastructure with competitive biofuels.

### **Federal Tax Credits:**

#### Alternative Fuel and Advanced Vehicle Technology Research and Demonstration Bonds

Qualified state, tribal, and local governments may issue Qualified Energy Conservation Bonds subsidized by the U.S. Department of Treasury at competitive rates to fund capital expenditures on qualified energy conservation projects. Eligible activities include research and demonstration projects related to cellulose ethanol and other non-fossil fuels, as well as advanced battery manufacturing technologies. Government entities may choose to issue tax credit bonds or direct payment bonds to subsidize the borrowing costs.

#### Biodiesel and Ethanol Infrastructure Grants

Competitive cost-share grants are available through the U.S. Department of Agriculture's Higher Blends Infrastructure Incentive Program (HBIIP) for the installation, retrofitting, or otherwise upgrading of fueling equipment and infrastructure required to dispense ethanol blends greater than 10% or biodiesel blends greater than 5%. Eligible applicants for the ethanol fueling equipment and infrastructure are vehicle fueling facilities, including fueling stations, convenience stores, hypermarket fueling stations, fleet facilities, and similar entities with capital investments. Eligible applicants for biodiesel fueling equipment and infrastructure are fuel/biodiesel distribution facilities, including terminal operations, depots, midstream partners, and similarly equivalent operations. An applicant may request assistance for more than one location, with one applicant per company.

Approximately 40% of funds will be made available to retail owners with 10 or fewer locations for activities related to upgrading or installing equipment to make transportation fueling facilities fully compatible to dispense or sell higher blends of ethanol and/or biodiesel.

Eligible new facilities may receive up to 50% of total eligible project costs, or \$3 million, whichever is less. Existing fueling stations that require upgraded, retrofitted, or additional underground storage tanks may request assistance of up to 25% of total eligible project costs or up to \$1,250,000, whichever is less.

## **California:**

### *Fleet Emissions Reduction Requirements - South Coast*

The South Coast Air Quality Management District (SCAQMD) requires government fleets and private contractors under contract with public entities to purchase non-diesel lower emission and alternative fuel vehicles. The rule applies to transit bus, school bus, refuse hauler, and other vehicle fleets of at least 15 vehicles that operate in Los Angeles, San Bernardino, Riverside, and Orange counties. This requirement provides an avenue for new customer recruitment, concentrating business development in fleets of vehicles that serve as government contractors.

### *Low Carbon Fuel Standard*

California's Low Carbon Fuel Standard (LCFS) Program requires a reduction in the carbon intensity of transportation fuels that are sold, supplied, or offered for sale in the state through 2030. The California Air Resources Board regulations require transportation fuel producers and importers to meet specified average carbon intensity requirements for fuel. LCFS regulated fuels include, natural gas, electricity, hydrogen, gasoline mixed with 10% corn-derived ethanol higher, biomass-based diesel, and propane. Non-biomass-based alternative fuels that are supplied in California for use in transportation at an aggregated volume of less than 3.6 million gasoline gallon equivalents per year are exempt from LCFS requirements. Other exemptions apply for transportation fuel used in specific applications. The LCFS Program allows producers and importers to generate, acquire, transfer, bank, borrow, and trade credits. Fuel producers and importers regulated under the LCFS must meet quarterly and annual reporting requirements. The California LCFS program creates a regulatory burden on fleets to reduce emissions, which incentivizes them to transition their vehicles away from conventional fuels and invest in biofuel compatible heavy-duty vehicles.

### *Low Emission Vehicle (LEV) Standards*

California has the most stringent vehicle emissions standards in the United States. California's LEV II exhaust emissions standards apply to Model Year (MY) 2004 and subsequent model year passenger cars, light-duty trucks, and medium-duty passenger vehicles meeting specified exhaust standards. The LEV II standards represent the maximum exhaust emissions for LEVs, Ultra LEVs, and Super Ultra LEVs, including flexible fuel, bi-fuel, and dual-fuel vehicles when operating on an alternative fuel. MY 2009 and subsequent model year passenger cars, light-duty trucks, and medium-duty passenger vehicles must meet specified fleet average greenhouse gas (GHG) exhaust emissions requirements. Each manufacturer must comply with these fleet average GHG requirements, which are based on California Air Resources Board (CARB) calculations. In December 2012, CARB finalized regulatory requirements, referred to as LEV III, which allow vehicle manufacturers compliance with the U.S. Environmental Protection Agency's GHG requirements for MY 2017-2025 to serve as compliance with California's adopted GHG emissions requirements for those same model years. The regulatory burden on conventionally fueled fleets creates a unique incentive for potential fleet customers to invest in low carbon-intensity biofuel vehicles rather than conventionally fueled vehicles.

## **California Policies and Regulations under Consideration:**

### *California SB 551 - California Zero Emission Vehicle Authority*

“This bill would establish the California Zero-Emission Vehicle Authority within the Governor’s Office of Business and Economic Development. The bill would require the authority to coordinate activities

among state agencies to advance zero-emission vehicle infrastructure deployment, including charging stations and hydrogen refueling stations, as well as ensure related equity, workforce development, economic development, and other needs are addressed, as specified. The bill would require the authority to publish on its internet website and report to the relevant policy committees of the Legislature an update on its progress in prescribed activities, including metrics in specified areas, including vehicle sales and job training. The bill would repeal these provisions on January 1, 2029.”

## Washington:

State-level regulations in Washington provide unique opportunities in the development of biofuel distribution. The policy landscape provides for frameworks that expand access to biofuel suppliers, mandate alternative fuel vehicle purchases for state agencies, and impose a mandatory minimum biodiesel requirement for all heavy-duty state-owned vehicles. This combination of policies presents a favorable landscape for biofuel distribution via the MFOD business model.

### Alternative Fuel Use Requirement

All state agencies must, to the extent practicable, use 100% biofuels or electricity to operate all publicly owned vehicles. Agencies must prioritize all-electric vehicles (EVs) when leasing or purchasing new vehicles, and all trips that may feasibly use EVs must employ them. For vehicle classes without EV model options, agencies must prioritize the most cost-efficient, low-emission vehicle option available. Agencies may substitute natural gas or propane for electricity or biofuel if the Washington State Department of Commerce (Department) determines that electricity and biofuel are not reasonably available. Practicability and measures of compliance are defined in rules adopted by the Department. The governor has established a cross-agency Governing Council, which must adopt and implement standards, measures, targets, and tools to support agencies in reducing greenhouse gas emissions and prioritizing EV adoption.

In addition, all local government agencies must, to the extent practicable, use 100% biofuels or electricity to operate all publicly owned vehicles. Transit agencies using compressed natural gas and engine retrofits that would void vehicle warranties are exempt from this requirement. To allow the motor vehicle fuel needs of state and local government to be satisfied by Washington-produced biofuels, the Washington Department of Enterprise Services and local governments may contract in advance and execute contracts with public or private producers and suppliers for the purchase of appropriate biofuels. Agencies may substitute natural gas or propane in vehicles if the Department determines that biofuels and electricity are not reasonably available. Practicability and measures of compliance are defined in rules adopted by the Department.

### Biodiesel Use Requirement

At least 20% of all diesel fuel used to fuel state agency vehicles, vessels, and construction equipment must be biodiesel. The Washington Department of Enterprise Services (WDES) must assist state agencies by coordinating the purchase and delivery of biodiesel if requested, using long-term contracts if necessary, to secure a sufficient and stable supply of biodiesel. For state agencies complying with the U.S. Environmental Protection Agency's ultra-low sulfur diesel (ULSD) mandate, at least 2% biodiesel (B2) must be used as an additive to ULSD for lubricity, provided that the use of a lubricity additive is appropriate and that performance and cost are comparable with other available lubricity additives. All agencies using biodiesel must submit annual consumption reports to WDES.

### Biofuels Production and Distribution Contracts

Conservation districts, public development authorities, municipal utilities, and public utility districts may enter crop purchase contracts to produce, sell, and distribute biodiesel produced from Washington feedstocks, cellulosic ethanol, and cellulosic ethanol-blended fuels for utility and public use. Additionally, municipal utilities and public utility districts may produce and distribute biodiesel, ethanol, and ethanol-blended fuels.

#### Low Carbon Fuel Standard

The Washington Department of Ecology will develop rules to establish a Clean Fuels Program (Program) that reduces the overall carbon intensity of transportation fuels used in the state by 20% below 2017 levels by 2035. The Program standards must be based on the carbon intensity of gasoline, gasoline substitutes, diesel, and diesel substitutes. The Program must go into effect no later than January 1, 2023.

#### Renewable Fuel Standard

At least 2% of all diesel fuel sold in Washington must be biodiesel or renewable diesel. This requirement will increase to 5% 180 days after the Washington State Department of Agriculture (WSDA) determines that in-state feedstocks and oil-seed crushing capacity can meet a 3% requirement. Renewable diesel is defined as a diesel fuel substitute produced from non-petroleum renewable sources, including vegetable oils and animal fats, which meet the federal registration requirements for fuels and fuel additives and ASTM specification D975.

At least 2% of the total gasoline sold in the state must be denatured ethanol. The ethanol requirement increases if the Washington Department of Ecology determines that this increase will not jeopardize the continued attainment of federal Clean Air Act standards, and WSDA determines that the state can economically support the production of higher ethanol blends.

All state agencies with jurisdiction over renewable fuel infrastructure, specifically storage, blending, and dispensing equipment, are required to expedite the related application and permitting processes. The governor may suspend these requirements by Executive Order if the standard is temporarily technically or economically infeasible, or poses a significant risk to public safety.

#### Washington State policies and regulations under consideration

##### HB 1075 (2021 - 2022) Reducing Emissions from Vehicles Associated with On-Demand Transportation Services.

The Bill would direct the state to set mandatory emission reduction targets for ride-hailing services like Uber and Lyft. The Bill failed to pass in 2021, was reintroduced, and retained in its present status for the 2022 legislative session.

##### SB 5373 (2021 - 2022)

This bill would enact a tax on carbon emissions, using the money raised through the tax to create a bond program that would finance infrastructure investments and economic recovery programs. Failed to pass out of the Senate committee.

#### **District of Columbia Metropolitan Area:**

##### [District of Columbia](#)

**Alternative Fuel Vehicle (AFV) Acquisition Requirements:**

District of Columbia Code [50-702](#) and [50-703](#) requires “fleets that operate at least 10 vehicles in the District of Columbia must ensure that 70% of newly purchased vehicles with a Gross Vehicle Weight Rating (GVWR) of 8,500 lbs or less and 50% of vehicles with a GVWR between 8,500 lbs and 26,000 lbs are clean fuel vehicles. For this requirement, a clean fuel is any fuel, including diesel, ethanol (including E85), hydrogen, propane, natural gas, reformulated gasoline, or other power source (including electricity) used in a clean fuel vehicle that complies with standards and requirements applicable to such vehicles. Certain exemptions apply.”

**Alternative Fuel Vehicle Conversion and Infrastructure Tax Credit:**

Businesses and individuals are eligible for an income tax credit of 50% of the equipment and labor costs for the conversion of qualified AFVs, up to \$19,000 per vehicle. A tax credit is also available for 50% of the equipment and labor costs for the purchase and installation of alternative fuel infrastructure on qualified AFV fueling property. The maximum credit is \$1,000 per residential electric vehicle charging station and \$10,000 per publicly accessible AFV fueling station. Qualified alternative fuels include ethanol blends of at least 85%, natural gas, propane, biodiesel, electricity, and hydrogen.

**Maryland**

**Alternative Fuel Use Requirement:**

At least 50% of state vehicles using petroleum diesel fuel must use a minimum blend of 5% biodiesel (B5) or other biofuel approved by the U.S. Environmental Protection Agency as a fuel or fuel additive. This requirement does not apply to any state vehicles for which the use of biodiesel or other biofuels will void the manufacturer's warranty for that vehicle. Biodiesel fuel is defined as a fuel composed of mono-alkyl esters of long-chain fatty acids derived from vegetable oils or animal fats that is designated B100 or a blend of biodiesel that meets the requirements of [ASTM](#) Standard D6751. Additionally, bi-fuel and flexible fuel vehicles capable of operating on either alternative fuel or conventional fuel must use alternative fuel when it is available.

**Aftermarket Alternative Fuel Vehicle Conversion Requirements:**

Conventional original equipment manufacturer vehicles altered to operate on propane, natural gas, methane, ethanol, or electricity are classified as aftermarket AFV conversions. All vehicle conversions for vehicles certified only to California Air Resources Board (CARB) standards must meet current applicable CARB standards for aftermarket conversions. However, U.S. Environmental Protection Agency (EPA) certified conversion kits may be used on EPA 50-state certified vehicles and vehicles with dual certification that are 14,000 pounds or less.

## Annex 3. Regulations and Policies related to Electricity and EVs

### Federal

#### Federal Infrastructure Bill

Bipartisan Federal Infrastructure Bill passed in Fall 2021 brings significant investment into the EV charging space and is expected to accelerate the build up of EV infrastructure across the country. It aims to create a convenient and equitable network of 500,000 chargers across the country for local and long-distances and includes \$5 billion in formula state funding and \$2.5 billion competitive grant for communities and corridors for innovative approaches.

This Bill also includes additional \$5 billion in funding for the EPA Clean School Bus rebate program, running from 2012. EPA may prioritize high need local educational agencies, low-income and rural areas, Tribal schools, and applications that provide cost share.

#### Internal Revenue Code (IRC) Section 30D

[IRC 30D](#) provides a credit for Qualified Plug-in Electric Drive Motor Vehicles including passenger vehicles and light trucks for residents and private fleet owners. Credit amount ranges from \$2,500 to \$7,500 in funding. Credit stops being applied to manufacturers when at least 200,000 qualifying vehicles have been sold.

#### 2021 American Rescue Plan (ARP)

[2021 ARP](#) includes \$7 million in funding for the [Electric School Bus Rebates](#). The funding will flow towards school districts in underserved communities and will help replace old diesel buses with zero-emission electric models.

#### 2021 Diesel Emission Reduction Act (DERA)

[2021 DERA](#) provides \$10 million in rebates to asset with 444 school bus replacements.

### California

#### CA EV Charging Station Law

Under the California EV Charging Station Law (Civil Code 1947.6(a), (b) tenancies have a right to install EV charging stations for both owner-occupied and renter-occupied units in condos, co-ops, and planned communities. The law states that the charging stations need to be located “within an owner’s unit or in designated parking space” with the caveat that the installation can occur in the common area if installation in the owner's designated parking space is impossible or unreasonably expensive.

#### Medium- and Heavy-Duty Zero Emission Vehicle Support

The State of California signed a memorandum of understanding (MOU) along with other states to support the deployment of medium- and heavy ZEVs through involvement in a Multi-State ZEV Task Force. The states will also accelerate the deployment of medium- and heavy ZEVs to benefit disadvantaged communities and explore opportunities to coordinate and partner with key stakeholders.

### Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP)

[HVIP](#) aims to streamline the deployment of zero-emission and near-zero-emission technologies by providing point-of-sale vouchers for vehicles. It is funded through California Climate Investments, allocated by the California Air Resources Board.

### Clean Off-Road Equipment Incentive Project (CORE)

[CORE](#) accelerates the adoption of zero-emission off-road freight equipment through provision of incentive vouchers. [Eligible equipment categories](#) are terminal tractor, truck and trailer mounted TRU, large forklift, container handling equipment, airport cargo loader, wide-body aircraft tug, railcar mover, mobile power unit (MPU) and ground power unit (GPU), and mobile shore power cable management system. Equipment deployed in disadvantaged and low-income communities (DAC) is eligible for a 10% enhancement of the equipment's base voucher amount.

### Executive Order N-79-20

[Order](#) from 2020 aims to have 100% medium and heavy-duty vehicles be zero-emission by 2045 where feasible, and drainage trucks by 2035; 100% zero-emission off-road vehicles and equipment by 2035 where feasible.

### Executive Order B-48-18

[Order](#) from 2018 sets a target of five million ZEVs by 2030 and 250,000 public EV charging stations in the state, including 10,000 fast-charging stations.

### SB 1044 the Clean Miles Standard and Incentive Program (the Clean Miles Program)

In 2021, the [California Air Resource Board](#) approved the Clean [Miles Standard](#) that aims to cut GHG emissions from ridesharing services, such as Uber and Lyft, by requiring that 90 percent of vehicle miles would be electric by 2030. The legislation aims to reduce GHG emissions from "rideshare" vehicles. The California Air Resource Board (CARB) fully adopted the Regulation in May 2021. The regulation directs CARB to develop and implement new requirements for transportation network companies (TNCs). The legislation sets [electrification targets](#) starting from 2023 and to be increased annually to reach 90% EVs in TNC's fleets by 2030. It also lays out GHG targets, which includes a reduction in CO2 emitted per mile traveled from 252 grams in 2023 to 0 grams in 2030. It also includes a scheme for obtaining CO2 credits to help with compliance.

## **Washington**

### Alternative Fuel Vehicle (AFV) Car Share Pilot Program - Revised Code of Washington (RCW) 47.04.355

The pilot program is to be administered by the Washington State Department of Transportation (WSDOT) in the 2023-2025 biennium and provide AFV use opportunities to underserved and low-income communities and to those without easy access to transportation corridors or located in transportation corridors with emissions that exceed federal or state emission standard. Nonprofit organizations and local governments with a proven track record of delivery of similar projects can participate in the bidding process for providing these services.

### Executive Order 21-04 Zero Emission vehicles

The [Order](#) institutes new Fleet Electric Vehicle (EV) Procurement Requirements for state executive and small-cabinet agency fleets. They must procure EVs to replace light-, medium-, and heavy-duty ICE vehicles with EVs once they reach the end of their useful life. Procurement requirements for light-duty vehicles: 40% in 2025, 75% in 2030, and 100% in 2035; for medium-duty vehicles: 30% in 2030, 55% in 2035, and 100% in 2030; for heavy-duty vehicles: 50% in 2030, 75% in 2034, and 100% in 2040.

*RCW 43.19.648 Publicly-owned vehicles, vessels, and construction equipment - Fuel Usage - advisory committee*

The [Fuel procurement rule](#) require state agencies and local governments to fuel publicly owned vehicles, vessels, and construction equipment with electricity or biofuels to the extent possible. The rules came into effect on Jun 1, 2018.

*House Bill 1278,2021 and RWC 19.27.540 Mandatory EVSE Building Requirements*

The [House Bill](#) and RWC require the Washington State Building Code Council to adopt rules for EVSE installation at all new buildings that provide on-site parking that include the following requirements: at least one parking space, or at least 10% of parking spaces, must be made available for Level 2 EVSE; electrical capacity must accommodate the potential to serve a minimum of 20% of the total parking spaces with Level 2 EVSE. Buildings classified as residential R-3 (row dwellings) must implement rules for EVSE installation by July 1, 2024. Council must adopt rules that exceed current requirements by the same date.

## **District of Columbia and Maryland**

*Electric Vehicle Supply Equipment (EVSE) Deployment Requirement*

The [Requirement](#) is imposed on the District Department of Transportation (DDOT), which must install at least 15 public EVSEs across the DC, including at least one charging station in each ward, and collect data on the usage of the facilities.

*DC: B23-0193 - Electric Vehicle Readiness Amendment Act of 2019*

The [Act](#) requires 20% of parking spaces in newly constructed or substantially renovated commercial or multi-unit buildings including electrical vehicle infrastructure. It also establishes an obligation for the Department of Energy and Environment to introduce incentives for owners of buildings to install EV make-ready infrastructure at parking spaces greater than the minimum of 20%.

*MD House Bill 0110, Condominium Act, and the HOA Act*

The Right-to-charge laws passed in eight states, including MD, prohibit condominium and homeowner associations from restricting the use and installation of equipment for EVs in “a unit owner’s deeded parking space or a parking space that is specifically designated for use by a particular owner.” The charging equipment should not “reasonably impede the normal use of an area outside the unit owner’s parking space.” Similar provisions apply to the rental properties. Individuals assume responsibility for all costs and the homeowners’ associations and rental property building owners are not required to pay for charging or to provide equipment as an amenity for multiple users.

*House Bill 784, 2021: EVSE New Construction Requirement*

According to the [Bill](#), all new homes which include a garage, carport, or driveway should include the option for a Level 2 EVSE or electric pre-wiring to support a Level 2 EVSE. Builders should also provide buyers with information on available rebate programs and notice of EVSE make-ready options.

*Senate Bill 137, 2021: Zero-Emission Bus Acquisition Requirement*

The [Bill](#) requires Maryland Transit Administration (MTA) to only purchase zero-emission buses for the state transit bus fleet and to develop charging infrastructure to support the electrified fleet starting from the fiscal year 2023.

*District of Columbia Code 50-741: Transportation Electrification Program - Emission Reduction Plan for Transportation Network Companies*

The [Code](#) provision requires each private vehicle-for-hire company to develop a GHG emission reduction plan by February 1, 2022, and every two years after and submit it to the DC PSC. Plans must include actionable proposals to decrease emissions and increase the proportion of drivers with zero-emission vehicles.

*District of Columbia Code 50-741: Transportation Electrification Requirements*

The Code provision also sets the requirements for the transition towards zero-emission vehicles for public buses, passenger- and light-duty vehicles associated with privately-owned fleets with a capacity of 50 or more passengers, or light-duty vehicles licensed to operate by DC, commercial motor carriers, limousine-service vehicles, and taxis certified to operate by DC. The rate of ZEVs starts at 50% in 2030 and reaches 100% by 2045.

*Medium- and Heavy-Duty Zero Emission Vehicle Support*

The District of Columbia and the State of Maryland signed a memorandum of understanding (MOU) along with other states to support the deployment of medium- and heavy ZEVs through involvement in a Multi-State ZEV Task Force. The states will also accelerate the deployment of medium- and heavy ZEVs to benefit disadvantaged communities and explore opportunities to coordinate and partner with key stakeholders.

## **Incentives**

Although this report does not go into detail on this, all three market states and their utilities run rebate and incentive programs for the purchase of EVs and EV charging equipment. Moreover, the federal government also provides a tax credit under the *Internal Revenue Code (IRC) Section 30D*. These incentives encourage EV ownership across the states.

## Annex 4. Details on the Evaluation Framework Results

### Conventional Fuels

Regulatory and policy environment. Almost all solutions for conventional fuels did not receive a score higher than 3 under this criteria. Partnership with car sharing services, mobile fueling at mobility hubs, and servicing of on-demand transit require flexibility in terms of where the mobile fueling can occur. This is one of the biggest challenges for the MFOD business model. The current regulation requires site plan permissions for mobile fueling and directly prohibits mobile fueling on public roads and public ways. However, this position is developing and there are bills under consideration that give higher flexibility. Therefore, we did not evaluate regulatory and policy environment criteria as a “no-go.”

Technological readiness and infrastructure capacity. All solutions for conventional fuels were given a score of 5 under this criteria. Partnership with car sharing services, mobile fueling at mobility hubs, and servicing of on-demand transit do not require any new technologies, investments in infrastructure capacity, or any substantial changes of the MFOD business model.

Business readiness and profitability. Mobile fueling at mobility hubs received high scores of 4 or 5 across the markets. If regulatory limitations are resolved, then the current MFOD business model can be applied towards serving mobility hubs in almost the same way Booster serves now corporate fleets. Stationary (parking lots) character of mobility hubs allows Booster to provide its services without any significant changes to its business model.

Impact on the energy transition and environmental justice. All solutions for conventional fuels were given a high score of 4. Partnership with car sharing services, mobile fueling at mobility hubs, and servicing of on-demand transit have significant positive net impacts on the energy transition and environmental justice.

Scalability of the technology. All solutions for conventional fuels were given the highest score of 5. We did not identify any issues and challenges that might preclude a large-scale application of the MFOD business model for partnership with car sharing services, mobile fueling at mobility hubs, and servicing of on-demand transit.

### Biofuels

Regulatory and policy environment. If a specific geographic market provided incentives for the deployment of biofuels or mandates for their use in particular circumstances, then those circumstances were allocated a score above 3. If there were instances where the market provided incentives to other fuel types but omitted biofuels, the score was given as less than 3.

Technological readiness and infrastructure capacity. Technological readiness is consistently above neutral for biofuels as the technology for distribution is in parallel with the existing infrastructure at Booster’s disposal.

Business readiness and profitability. This score was determined by the anticipated density of biofuel use vehicles within the scenario recommended. If there is a case where biofuels are disincentivized, then the profitability stands below a score of 3. In cases where there are regulatory burdens imposed upon biofuel operations, the score is allocated as a 1. If there are specific markets where the deployment of biofuel capacity was consistent and highly profitable, then those scenarios received a score of 4 and higher.

Impact on the energy transition and environmental justice. These scores were determined based on the magnitude of biofuel distribution's effects on the communities in close proximity to the Booster area of operation. Biofuels have a positive impact on environmental justice when they are replacing more polluting fuels in high volumes. As such, the magnitude of impact on environmental justice outcomes is increased when high volumes of conventional fuels are replaced by biofuels.

Scalability of the technology. This parameter was assessed based on whether it was feasible for Booster to redeploy existing tanker infrastructure during operational windows to service customers. If the redeployment of tanker infrastructure would be disadvantageous to Booster revenues, then the score was allocated as less than a 3. If Booster revenues would remain relatively constant with the redeployment of tanker infrastructure, the score was allocated as neutral. If the redeployment of tanker infrastructure would result in relative profitability for Booster, the score was allocated as higher than a 3.

## **Electricity and EVs**

Most recommendations received similar scores across all markets in terms of regulatory environment, with a few exceptions. Right-to-charge laws increased the California and Maryland/DC market scores for the “Provide EV charging for multi-family dwellings.” The TNC electrification mandate in California makes the environment more suitable for collaboration with TNCs and carsharing fleets, increasing the score.

Technology readiness and infrastructure capacity received 2 for all markets and recommendations as current mobile charging technology is nascent and needs to be developed. There are also significant considerations across charging rates to make the recommendation viable. Additional challenges arise from the technological side regarding charging off-road construction equipment, as there might be a need for additional adapters, decreasing the score further.

Business readiness and profitability scoring is based on whether Booster currently provides similar services, availability of partners, ease of acquiring all necessary permitting, and similar considerations. Providing off-road construction equipment charges received the lowest score as Booster does not currently offer similar services. This recommendation will require considerable change in the business approaches, approaching new categories of clients, and adjusting rates. Delivering charging for corporate campuses and retail and electrifying transportation hubs scored higher as it follows a similar business model to current conventional fuel operations. Testing locations for permanent infrastructure scored high as it was proposed before by another company and does not require extensive permitting. Partnering with TNCs and carsharing received a score of 3 as it is a plausible recommendation, but Booster has never partnered with similar service providers before, so challenges might arise. Providing EV charging for multi-family dwellings received a score of 2 as the permitting process for charging in parking garages and collaborating with rental companies might prove difficult.

All recommendations received similar scores across markets in terms of impact on energy transition and environmental justice. The first three recommendations, which include providing charging in multi-family dwellings and partnerships with TNCs and carsharing providers, are likely to benefit underserved communities. Other suggestions have no or ambiguous impact on this issue.

The scalability of technology is assessed based on the availability of opportunities in the market for each recommendation. Based on the regulatory and business environment, charging in multi-family dwellings is most scalable in California and Maryland/DC markets. Collaboration with TNCs and ridesharing is more scalable in California than in other markets due to the higher market penetration of EVs and current electrification directives. Delivering charging for corporate campuses is plausible across all markets, but

the availability of permanent charging infrastructure at many locations limits the scalability. Testing location for permanent infrastructure is a very niche recommendation and is unlikely to present an opportunity on a scale, so the score is low. California policies are likely to accelerate the transition towards electric fleets for TNCs and carsharing, creating a larger number of opportunities in these spheres for Booster. Right-to-charge laws in California and Maryland/DC create replicability opportunities in the market, leading to a higher score of 4.

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