

Ava Community Energy: Zero-Emission Medium- and Heavy-Duty Goods Movement Blueprint

Attachment 3: Summary of Financing Options

August 2022

This document was submitted as a deliverable for California Energy Commission's Agreement Number ARV-21-003 under Task 4 - Assess Product Readiness. The goal of Task 4 is to understand zero-emission vehicle technology readiness across medium-and heavy-duty good movement vocations and applications, and the suitability of charging infrastructure technologies and types.

Table of Contents

- Financial Solutions3**
 - Summary of Vehicle Procurement Methods and Solutions 3
- Establishing a Baseline3**
 - Vehicle Barriers to Adoption 4
 - Infrastructure Barriers to Deployment 5
- Innovative Financing Solutions5**
 - Capital Instruments 5
 - Risk Reduction Instruments 9
 - Cost Smoothing Instruments..... 9
- Complementary Funding Structures and Programs10**
- Incentive Tools12**

Financial Solutions

Summary of Vehicle Procurement Methods and Solutions

The zero-emission (ZE) medium-and heavy-duty (MDHD) goods movement vehicle transition within Ava Community Energy's (Ava) service territory will be accelerated through the development of innovative financial strategies. Ava is uniquely positioned as a major procurement agency and electricity provider who has signed utility scale renewable energy and front of the meter battery storage contracts with major developers and financial institutions.

The purpose of this Financing Report is to provide Ava with a baseline understanding of the ecosystem of financing and other mechanisms in the market applicable to ZE MDHD vehicles and charging infrastructure. Ava leveraged findings from other finance research initiatives to establish this baseline. These include recent CALSTART financing roundtables, the Drive to Zero program's network of financing experts, the statewide Transportation Electrification Partnership (TEP) and the Port of Long Beach's *2019 Innovations in Private Finance Report*.

In Ava's original Blueprint narrative, Ava planned to issue a private financing Request for Information (RFI) to gain insight on specific near-term opportunities and barriers facing the electrification of Class 3-8 goods movement vehicles. For those not comfortable responding to a public RFI, Ava planned to facilitate individual discussions. The scope of this work was slightly modified to diverge into two concurrent pathways.

1. Ava identified innovative financing considerations for ZE MDHD vehicle procurement. These financing solutions are being discussed among the Ava and CALSTART team with the intent to materialize the details of the proposed solutions into feasible and actionable strategies in the Blueprint.
2. Ava issued a targeted solicitation to the finance community (under non-disclosure agreements) to develop solutions that will rapidly scale deployment of fast charging infrastructure.

Understanding how critical financing is, Ava recently also acted, independent but related to the Blueprint's scope of work, to accelerate market adoption of ZE MDHD vehicles. In June 2022 Ava's Board of Directors approved a staff request of \$3 million that will be used as a credit enhancement to assist stakeholders with ZE MDHD vehicle and charging infrastructure financing. Ava is currently working on a Request for Offer solicitation that will invite vehicle and charging infrastructure projects from the market. Ava is happy to share the solicitation link with the CAM once released in September 2022 and will provide informal updates.

Establishing a Baseline

In April 2021, CALSTART published a white paper [*Taking Commercial Fleet Electrification to Scale*](#). This white paper identified significant barriers to entry from a fleet's perspective and several financing strategies that will reduce ZE vehicle and charging infrastructure transition risk. It must be noted that the report did not focus on any specific state and that some barriers (high upfront costs) are already being addressed in Ava's service area through grant and incentive programs funded by public agencies in California.

Additionally, Ava's ZE MDHD Goods Movement Blueprint is not focused solely on the individual fleet but highlighting Ava's role as a major procurement agency, and the default electrical Load Serving Entity. Both

put Ava in a strategic position to help accelerate the market. In short, if Ava were able to develop financing solutions for its commercial and industrial customers, where and how could those solutions have the biggest impact?

The following barriers were considered by Ava.

Vehicle Barriers to Adoption

Residual value

Residual value is the unknown quantity of value left in a zero-emission vehicle at the end of any period, such as the term of financing that vehicle. Because of unknowns within resale prices in secondary markets, which are virtually nonexistent today, larger fleets that transition to ZE MDHD vehicles must conservatively assume that residual value is zero. This, of course, is not the case for the financing mechanisms and market established for their diesel equivalents. There may be an opportunity here for Ava to have a role in the guarantee for these vehicles. For example, Ava could consider a guarantee on a certain percentage of the value of a ZE MDHD vehicle in providing grid services in the future.

High upfront cost

Today ZE MDHD vehicles are more expensive than comparable Internal Combustion Engine (ICE) models today. On top of the upfront vehicle procurement cost is the necessary charging infrastructure cost. However, the total cost of ownership must be considered given the savings associated with the operation and maintenance efficiencies of a ZE MDHD vehicle over its lifetime compared to an ICE vehicle. This includes savings associated with using electricity as a transportation fuel instead of being exposed to the volatile diesel market.

Incentives can also assist with reducing high upfront costs for both vehicles and charging infrastructure. As further detailed below, the CARB-funded Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) program provides vouchers ranging from \$45,000 to \$120,000 for Class 3-8 vehicles, with the opportunity to obtain plus-ups or additional voucher amounts if fleets are located within a disadvantaged community. In addition, new state and federal funding will provide further cost reduction opportunities. See *Complementary Funding Structures and Programs* below. Ava may have a role in the development of partnerships with public and private entities to stack funding resources.

Lack of model availability

Fleet operators cited the lack of commercial ZE MDHD vehicles for their specific operational requirements. Stakeholders noted they perceive segments like refrigeration and long-haul do not have viable model options especially for use cases that need to be customized. Ava's Blueprint fleet readiness analysis identified ZE MDHD vehicle availability by vocation and class, establishing a structured framework for how certain use cases or vehicle types can be early adopters.

Technology risk

The pace of change is accelerating, bringing much needed improvements in ZE MDHD vehicles. This includes pros including enhanced performance and reduced costs, as well as cons like the potential for product obsolescence. Stakeholder engagement of small fleet and single owner operators substantialize this fear and the ability to "wait and see" as larger fleets are more willing to take on risk as early adopters driven by corporate sustainability policies.

Infrastructure Barriers to Deployment

Utilization risk

There is a hesitation among developers of publicly available charging infrastructure to build assets that do not yet have a known customer base. That is, when fleets and single owner operators make the transition to ZE MDHD vehicles at scale is to-be-determined. Charging infrastructure is expensive to build, operate and maintain. It requires elevated levels of utilization to recoup the investment. Ava may be able to create pipelines of users through vehicles and charging infrastructure solutions it develops.

Rate design

Across the U.S. utility rate structures and demand charges vary. In California regulators have approved Investor-Owned Utility rate design that aims to benefit ZE MDHD fleets and owner operators while balancing demand on the grid. However, fleet operators are unaccustomed to their fuel expenses being tied to the electricity bill which is not often widely understood generally. In turn, this is seen as a risk as if they charge at times of peak demand the cost can add up. As the default Load Serving Entity in the communities it serves, Ava can develop and set new rates without approval from the California Public Utilities Commission. This could be a crucial step in establishing its service area as a first mover market for ZE MDHD vehicle adoption.

Innovative Financing Solutions

There are numerous mechanisms to finance vehicles and reduce risk in this evolving asset class. The instruments detailed below have been referenced from the CALSTART white paper, as well as EDF's report [*Financing the Transition: Unlocking Capital to Electrify Truck and Bus Fleets*](#).¹

Capital Instruments

First Loss Protection

First Loss Protection insulates lenders from a pre-defined amount of financial loss due to a specified risk. This financial product or strategy is commonly used in insurance policies. A first loss policy is a property insurance policy in which the policyholder arranges cover for an amount below the full value of the items insured and the insurer agrees not to penalize the policyholder for under-insurance. This is for insuring items based on an assumption of a low likelihood that the complete value of the items or property will be stolen. For example, a federal or state agency (or even a group of green banks) acts as a First Loss Protection Provider (FLPP) that takes on a specified residual value risk. By establishing a first loss protection on a residual value, the FLPP then becomes a third party in a transaction between a financier/lender and a fleet. Development of the first loss protection will require extensive research on technology, equipment performance, mileage, and duty-cycle projections. However, the initial research completed by the FLPP may be a driver for lenders to assume the risks as they would become quantifiable. Another supporting element for the introduction of a first loss protection is the potential acceleration of a secondary market as there will be more assurance and industry knowledge of the resale of the vehicle.

Ava aims to better understand the feasibility of assuming the role of a FLPP, and how to leverage partnerships with other state agencies. Also see Credit Enhancement below.

¹ <https://www.edf.org/energy/financing-transition-electric-truck-and-bus-fleets>

Pay-Per-Use Models

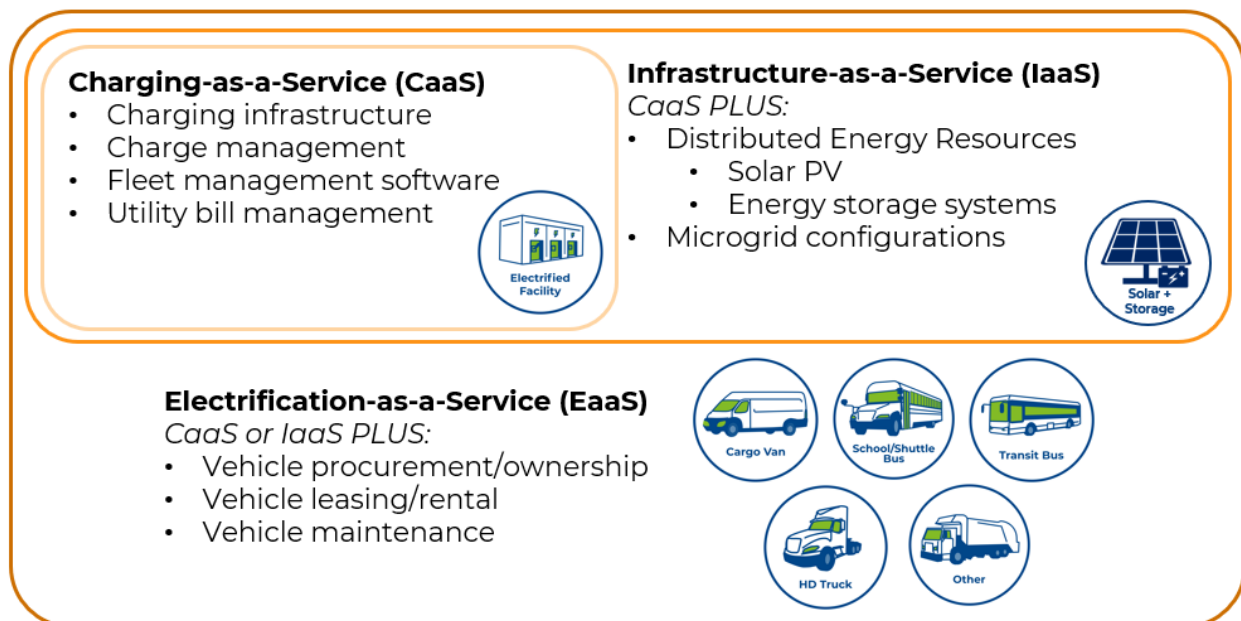
The emergence of third-party solution providers will create efficient pathways between ZE MDHD vehicle OEMs and/or lenders and fleets. Start-ups are enabling ZE MDHD adoption, leveraging institutional capital, through pay-per-mile vehicle financing. These models claim to free up cash flow and optimize fleet utilization, while financiers benefit from diversified portfolios and better risk-adjusted returns.

There are different variations of this model, where the financier would own the fleet and use the pay per mile model to deploy the vehicles. In another variation, the fleet would purchase the vehicles from the OEMs for a fixed period and pay per mile up to a certain number of miles. There is flexibility for fleet ownership of the procured vehicles that also may lead to the development of a secondary market.

Electrification as a Service

Electrification as a service (EaaS) is a financing model where a third-party provider includes ZE MDHD vehicles and charging infrastructure for a base rate. This alternative solution offers the ability for fleet and owner operators to pay fixed ongoing fees (e.g., \$/month, \$/kWh, \$/mile) over a service period – generally eight to ten years – at rates competitive with or lower than the cost of operating an ICE vehicle. These structures can mitigate operator adoption risks by blending the operational cost savings of vehicles that have regular and predictable routes and operations with their higher upfront costs (vehicle and/or infrastructure) to create an attractive business case at a reasonable payment rate. In addition to for profit companies offering these services as their core business model, several OEMs, charging infrastructure providers, and public power providers (including Ava), are exploring some version of this model. See *Cost Smoothing* below.

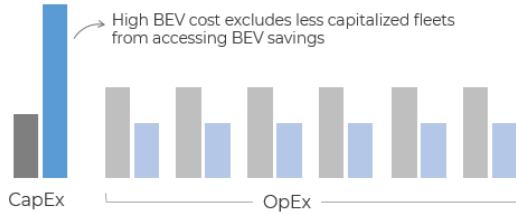
Figure 1. Relationships and Definitions of "as a Service" Models



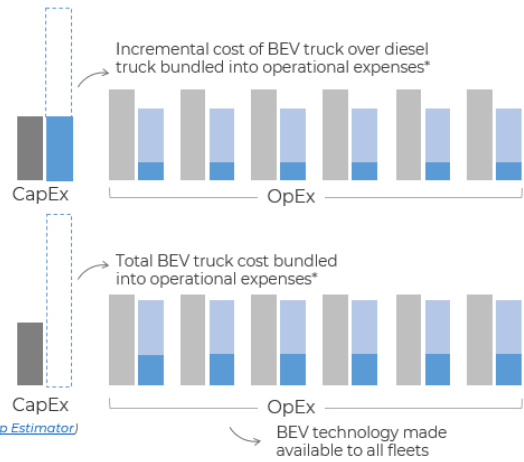
Total Cost of Ownership



Traditional Procurement Model



Electrification-as-a-Service Procurement Models



* Vehicle cost bar increased in OpEx due to cost of financing. For illustrative purposes only. Cost proportions based on Class 6 Truck (using the [HVIP Total Cost of Ownership Estimator](#))

Figure 2. TCO in an EaaS Model

Bulk Purchasing Agreements

One of the strategies identified by the Port of Long Beach's [Charging Ahead: The Port Community Electric Vehicle Blueprint](#) is the ability to utilize partnerships to explore the development of funding programs that may allow operators or fleets to pool equipment purchase agreements. While the focus of Ava's Blueprint is not limited to the Port of Oakland, the consideration for bulk purchasing agreements among Ava's commercial and industrial customers throughout their service area may reduce risk for at scale, especially for smaller MDHD fleet electrification investments. This in turn attracts investors looking for larger opportunities which can transform one-off, non-traded assets into standardized, tradable assets. Bulk purchasing agreements are common in the renewable energy and energy efficiency sectors and have been demonstrated to catalyze the flow of capital.

Public-Backed Soft Loan

Offering low interest rates, longer maturity, reduced collateral requirements, grace periods or subordinated debt, these loans can support fleet electrification investments not suitable for commercial term borrowing.

Credit Enhancement

A credit enhancement is anything that improves the chances that financing will be repaid. Credit enhancements are useful as they encourage lenders and investors to put money into unfamiliar markets or products such as ZE MDHD vehicle lending. A credit enhancement can absorb the risk of loss and, as a result, be used as a negotiating tool to convince lenders to reduce interest rates or provide longer loan terms. Credit enhancements can also be used as negotiating leverage to convince lenders to relax their underwriting criteria to lend to businesses or individuals with lower than typical credit profiles. A credit enhancement can take one of several forms:

- Loan loss reserve
- Loan guarantee
- Loan loss insurance

- Debt service reserve
- Subordinated/senior capital structure

Financial Grants

Financial grants are direct transfers to fleets or owners that reduce the purchase price of new vehicles and/or infrastructure by covering part of the capital cost of new assets. Direct grants have been used frequently and exhaust public capital quickly.

Commercial Bonds

Commercial bonds are debt instruments issued by private businesses engaged in fleet electrification that entitle creditors to interest coupon payments. These can help businesses raise capital to finance large upfront costs for corporate projects.

Green Bonds

A green bond is a type of fixed-income instrument that is specifically earmarked to raise money for climate and other environmental projects. These bonds are typically asset-linked and backed by the issuing entity's balance sheet, so they can carry the same credit rating as the issuer's other debt obligations. The green credentials of these instruments can attract heightened interest from investors and could lead to lower interest payments. Green bonds are generally accessible to institutional investors and not individuals.

Municipal/Revenue Bonds

Municipal bonds are debt instruments issued by public entities to enable them to raise capital to finance large upfront costs for municipal projects. Municipal bonds entitle creditors to interest coupon payments. Revenue bonds, specifically, are municipal bonds supported from the revenue from a specific project, initiative, or portfolio of income-producing activities. Transportation electrification revenue bonds could be tied to a specific program or initiative that generates a return to service the bonds or could be issued with an independent revenue stream pledged to provide cash grants to priority projects.

Operational Expenditure Grants

Operational expenditure grants include cash grants, rebates or reimbursements for operational costs connected to ZE MDHD fleets, such as electricity and maintenance. These can help to reduce ongoing costs for fleet owners and operators.

Non-Financial Grants

Non-financial grants are transfers of non-financial assets or support (such as land, infrastructure, maintenance, training, etc.) to reduce upfront or ongoing costs for ZE MDHD fleet owners and operators.

Conduit Financing

Conduit financing allows private companies, non-profit organizations, and public entities to raise capital for large-scale projects benefiting the public with tax-exempt bonds. The difference between a revenue bond and conduit financing is that revenue bonds are typically backed by revenues pledged by a public agency, whereas conduit borrowing would be backed only by a specific project's pledged revenue streams.

The California Infrastructure and Economic Development Banks (IBank)² is the State's only general-purpose financing authority and one of the primary issuers of tax-exempt and taxable conduit financing; however, many other conduit issuers target specific borrower or project types. Other state and local issuers have overlapping mandates and programs but are able to issue tax-exempt private activity bonds on behalf of public agencies, special districts, nonprofits, and other projects that promote economic development or provide critical community services.

Revolving Loan Fund

A revolving loan fund (RLF) is a self-replenishing pool of money that uses interest and principal payments on old loans to issue new ones. This financing tool is primarily used for smaller projects and initiatives and is often combined with other conventional sources as gap financing, bridging between the amount the borrower can obtain on the private market and the amount needed to initiate a project.

Risk Reduction Instruments

The instruments detailed in the EDF report provide options to remove barriers and reduce risks.

Performance Guarantee

As a mechanism to reduce investment risk, a performance guarantee protects a fleet or operator from the potential underperformance of a vehicle or its batteries. These are typically provided as government-backed guarantees.

Asset Residual Value Guarantee

Asset residual value guarantees protect investors or purchasers against future low residual or resale value of ZE MDHD vehicles by specifying a guaranteed minimum value, through direct purchase or making up price differentials.

Financial Risk Guarantee

These guarantees protect investors in fleets against losses due to debt servicing defaults on the part of the borrower for any reason, including under performance of assets. The Title 17 Federal Loan Guarantees for Renewable Energy Projects and Energy Efficient Projects is a framework that addresses projects of similar size and scope as large transportation-related infrastructure and vehicle purchases.

Cost Smoothing Instruments

In addition to direct hard cost financing instruments and guarantees to reduce investment and/or performance risk, there are also numerous mechanisms that make the overall economics of the investment more sustainable for owners and/or other fleet investors.

Operational Leasing

Like any other equipment lease, this process involves the fleet operator renting both the vehicle and battery from the manufacturer or an intermediary, reducing upfront purchase costs and the risk from uncertain residual values of assets. It does not, however, cover the maintenance or insurance of vehicles.

² <https://ibank.ca.gov/>

[Wet or Wrap Around Leasing](#)

A wet lease is a model where the lessor provides the vehicle, battery, maintenance, and, in some cases, the insurance and operational staff, to the fleet operator. This reduces upfront purchase costs, risk from uncertain residual values of assets and the need to invest in maintenance or the training of staff. See EaaS above.

[Lease-Purchase Agreement](#)

Under a lease-purchase a fleet operator rents vehicles and batteries with the option to buy upon termination of the contract, reducing upfront purchase costs and risks from uncertain residual values of assets, while preserving the exclusive option to purchase assets at the end of the lease.

[On-Bill Financing](#)

On-bill financing could enable fleet operators to finance a share of the upfront costs and repay it over time on their utility bill. This reduces upfront purchase costs, links repayments to standing relationships, and provides a new guaranteed revenue source to utilities. Often used for residential and/or commercial energy efficiency, the Pay-As-You-Save (PAYS) model is a specific case of on-bill financing.

[Complementary Funding Structures and Programs](#)

The following are summaries of programs funded by the California Air Resources Board (CARB) and the California Energy Commission to incentivize the adoption of zero-emission vehicles and infrastructure. Education and outreach efforts of these programs to Ava customer fleets can complement financial strategies set in place to accelerate the adoption of ZE MDHD vehicles.

[Carl Moyer Program](#)

The Carl Moyer Memorial Air Quality Standards Attainment Program ([Carl Moyer Program](#)) provides grant funding for cleaner-than-required engines, equipment, and other sources of air pollution. It is implemented as a partnership between CARB and California's 35 local air districts. The Bay Area Air Quality Management District (BAAQMD) manages the Carl Moyer Program in Ava's Alameda County service area. Funding is offered on a first-come, first-served basis. Eligible vehicles or equipment need to have at least one to three years until regulation compliance or are exempt from regulation and operate within the Air District's boundaries. Project types include:

- Equipment/Vehicle replacement - replace an old vehicle or piece of equipment with the cleanest available vehicle or equipment.
- Engine replacement (repower) - replace an old engine with a new, emission-certified engine.
- Power system conversion – convert existing equipment to operate on electric or hybrid power.
- Battery charging and fueling infrastructure - install infrastructure to charge or fuel new, funded equipment. Infrastructure only projects may be considered on a case-by-case basis.

[Prop 1B Good Movement Emission Reduction Program](#)

The [Proposition 1B: Goods Movement Emission Reduction Program](#) is a partnership between the CARB and local agencies to reduce diesel emissions and health risk from freight movement along California trade corridors. Projects funded under this program must achieve early or extra emission reductions not otherwise required by law or regulation. BAAQMD administers the Goods Movement Program in Ava's Alameda County service area. While it is not required, BAAQMD provides a list of [certified truck dealers](#)

to inspect an old truck and sell a new truck that will be compliant with California truck regulations. The program does require a certified dismantler to conduct required inspections and complete paperwork for the program. Eligible vehicles must:

- Move goods for sale or for purchase;
- Operate at least 50% of time in the [California trade corridor](#)³;
- Existing equipment must be diesel-fueled; and
- Be California Fleet compliant.

Table 1. Prop 1B: Goods Movement Program Options

<i>Upgrade Options</i>	<i>Class 5</i>	<i>Class 6</i>	<i>Class 7/Class 8</i>
<i>Zero Emission Truck</i>	\$80,000	\$100,000	\$200,000
<i>Engine Repower</i>	NA	\$10,000	\$20,000
<i>Electric Charging / Hydrogen Fueling Infrastructure</i>	\$30,000 or 50% of eligible costs	\$30,000 or 50% of eligible costs	\$30,000 or 50% of eligible costs

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

The HVIP program is slightly different than the Carl Moyer or Prop 1B program in that it does not involve a grant application. As a voucher program, HVIP provides point-of-sale vouchers through approved dealers that apply savings at time of purchase. HVIP accelerates the deployment of ZE MDHD vehicles. HVIP is implemented through a partnership between CARB and CALSTART and provides vouchers on a first-come, first-served basis. In addition, HVIP provides increased incentives for fleets domiciled in disadvantaged communities.

Table 2. HVIP Voucher Funding Amounts

Vehicle Weight Class	Base Vehicle Incentive or plus-up modifiers⁴
Class 2b	\$7,500
Class 3	\$45,000
Class 4-5	\$60,000
Class 6-7	\$85,000
Class 8	\$120,000
Class 8 Drayage Truck Early Adopter	+25%
Disadvantaged Community	+15%
Class 8 Fuel Cell	+100%

Energy Infrastructure Incentives for Zero-Emission (EnergIIZE) Commercial Vehicles

The [EnergIIZE Commercial Vehicles program](#) is focused on infrastructure. EnergIIZE is a \$69 million incentive project funded through the California Energy Commission and administered by CALSTART and its partners, Tetra Tech and GRID Alternatives. EnergIIZE provides infrastructure incentives for public

³ Alameda County is included within the Bay Area Trade Corridor.

⁴ As of FY22 [Implementation Manual](#)

and private commercial fleets that seek to deploy battery electric or hydrogen fuel cell vehicle technology.

Incentive Tools

In addition to financing tools, there are incentive tools that can lower the total cost of electrification. These are indirect but are relevant to the overall economics of a fleet or owner operator's ZE transition.

Low Carbon Fuel Standard (LCFS)

The California Air Resources Board approved the [Low Carbon Fuel Standard](#) (LCFS) in 2009 to reduce the carbon intensity of California's transportation pool fuel by incentivizing the use of low and zero-carbon intensity fuels. The program establishes an annual carbon intensity score for each fuel that reflects the emissions from the fuel's life cycle. Low carbon fuels below the annual CI benchmark can generate credits. Ava's Renewable 100 electricity product was the first 100% electricity product in the state to be registered with CARB as a zero carbon-intensity fuel and the first to be added to the zero-CI lookup table. Using Ava's Renewable 100 electricity as a transportation fuel generates high value LCFS credits.