

# Operational and Budgetary Impacts of the CARB Advance Clean Fleets (ACF) Regulation

## State and Local Government Regulation Component

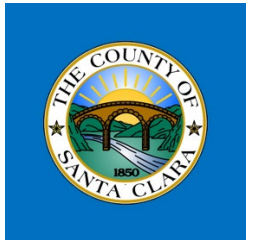
Vehicles, Refueling, Facilities, Staffing, Operations, and Budgets.....**Everything Will Change**



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# Topics

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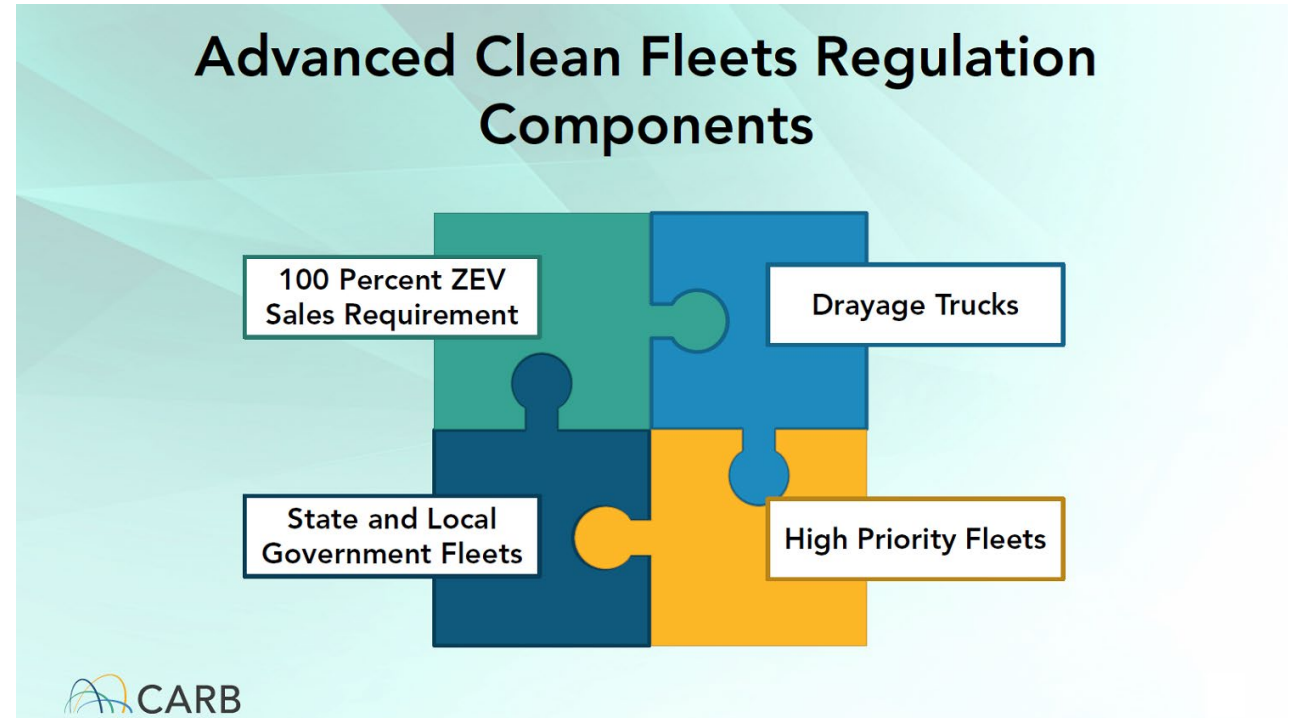
- Overview of ACF Regulation
- Exemptions / Extensions / Utilities
- Zero Emissions Vehicle (ZEV) Definition
- Procurement Documentation, Reporting, & Records Requirements
- ZEV Fueling Infrastructure and Planning
  - Fueling Infrastructure Cost Examples
- Operational Challenges
- Accident Damage, EV Fires & Safety Protocols
- Budget Impact Examples
- Compliance Strategies
- Grants, Rebates, Vouchers, Etc.
- Necessary Collaboration
- Questions & Answers

# The California Air Resources Board Advanced Clean Fleets (ACF) Regulation

The CARB Board of Directors voted and approved the ACF regulation on 4/28/2023

There are three fleet components of the regulation

- Drayage Fleets
  - Trucks traveling to and from Seaports, Airports, Intermodal Railyards and other Ports of Entry
- High Priority and Federal Fleets
  - Private and Federal Fleets
- State and Local Governments Fleets
  - **Cities, Counties, State, and other Government Agencies and Districts**



<https://ww2.arb.ca.gov/our-work/programs/advanced-clean-fleets>

# Advance Clean Trucks Regulation – Companion to ACF

## Enacted Prior to ACF Regulation

- Requires vehicle manufacturers to sell an increasing percentage of their total sales volume as Zero Emissions Vehicles (ZEVs).
- Required private and government fleets to submit a fleet report to CARB staff by 3/31/2022
  - **If you have not reported yet, do so as soon as possible.**
  - **The ACF reports that must be submitted each year may be compared to your original ACT report submission.**

## Advanced Clean Trucks (ACT)

- Manufacturers must sell ZEVs as a percentage of sales\*
- Approved June 2020
- Begins with 2024 model year
- Credit for sales start in 2021
- Minimum tractor sales
- Flexibility to shift sales between categories
- One-time fleet reporting

Model Year (MY)	Class 2b-3	Class 4-8	Class 7-8 Tractors
2024	5%	9%	5%
2025	7%	11%	7%
2026	10%	13%	10%
2027	15%	20%	15%
2028	20%	30%	20%
2029	25%	40%	25%
2030	30%	50%	30%
2031	35%	55%	35%
2032	40%	60%	40%
2033	45%	65%	40%
2034	50%	70%	40%
2035+	55%	75%	40%



\*Partial credit for near-zero emissions vehicles (NZEVs). NZEVs are plug-in hybrids with minimum all electric range

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<https://ww2.arb.ca.gov/our-work/programs/advanced-clean-trucks>

# Advance Clean Trucks Regulation – Companion to ACF

Regardless of the compliance strategy utilized, only ZEVs will be available in the marketplace to purchase as replacements for Class 2b-8 vehicles beginning with model year **2036** vehicles.

100 Percent ZEV Sales

## 100 Percent ZEV Sales Requirement

Starting 2036 instead of 2040, all Class 2b-8 vehicles sold into California must be ZEVs

- Provides certainty to the market and supply chain for manufacturers, fleets, infrastructure providers, service technicians, partner agencies, and local governments
- Expands market choice



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# ACF State and Local Government Requirements

## Scope and Applicability

- Any state or local government agency with jurisdiction in California that owns, leases, or operates one or more vehicles that have a Gross Vehicle Weight Rating (GVWR) greater than 8,500 pounds (3/4 ton vehicles and larger)
- Included are Hiring Entities such as motor carriers, brokers, governmental agencies, persons, or entities that hire and operate, or hires and directs the operation of vehicles in California.

**“State or local government agency”** means a city, county, public utility, special district, local agency or district, or a public agency of the State of California, and any department, division, public corporation, or public agency of the State of California.




State and Local Government Fleets

## State and Local Government Requirements

2024-2026      January 1, 2027

50 percent of purchases must be ZEV or NZEV      All purchases must be ZEV or NZEV

- Agencies in designated counties and divisions with 10 or fewer trucks exempt until 2027
- May use exemptions and extensions



# ACF State and Local Government Requirements

## ZEV Milestone Phase In Option

- May be beneficial if you already have charging or hydrogen fueling infrastructure in place, or it can be installed by 2025 for Group 1 vehicles.
- May work for small fleets that have a lower overall cost of fueling infrastructure.
- Adding applicable ICE vehicles to your fleet count will affect your ZEV compliance percentage immediately.
- Delaying fueling infrastructure installation in later years will be at an increased cost.
- **Only ZEVs will be available to purchase beginning with Model Year 2036.**

## ZEV Milestone Option

### Optional ZEV Milestone Phase-in

- Open to High Priority and State and Local Government fleets
- Must meet ZEV milestones as a percent of total fleet
- Flexibility to add new ICE vehicles that are California certified or used ICE vehicles with 2010 or newer model year

Zero-Emission Fleet Percentage	10%	25%	50%	75%	100%
Group 1: Box trucks, vans, 2-axle buses, yard trucks, light-duty package delivery vehicles	2025	2028	2031	2033	2035
Group 2: Work trucks, day cab tractors, 3-axle buses	2027	2030	2033	2036	2039
Group 3: Sleeper cab tractors and specialty vehicles	2030	2033	2036	2039	2042



Work truck means any single-unit truck that is not a box truck, van, bus, or specialty vehicle

**Must declare using the ZEV Milestone Phase-in Option by 4/1/2024. After electing to use this option, fleet owners are no longer subject to and may not switch back to the State or local government fleet requirements.**



# ACF Regulatory Application Confusion

## Be Prepared to Explain the Differences Between the Three Fleet Components

- Television, Newspapers, Websites, and Social Media are sharing information mainly focused on the High Priority and federal Fleets.
- What is being miscommunicated:
  - All big trucks will need to be replaced by Zero Emission (ZEV) trucks by 2045.
  - All big trucks will need to be Battery Electric Vehicles (BEVs).
- Actual Impact to Government Fleets:
  - **50%** of new truck purchases over 8,500 GVWR must be a ZEV from **1/1/2024 to 12/31/2026**
  - **100%** of new truck purchases over 8,500 GVWR must be a ZEV beginning in **1/1/2027**



Public Perception

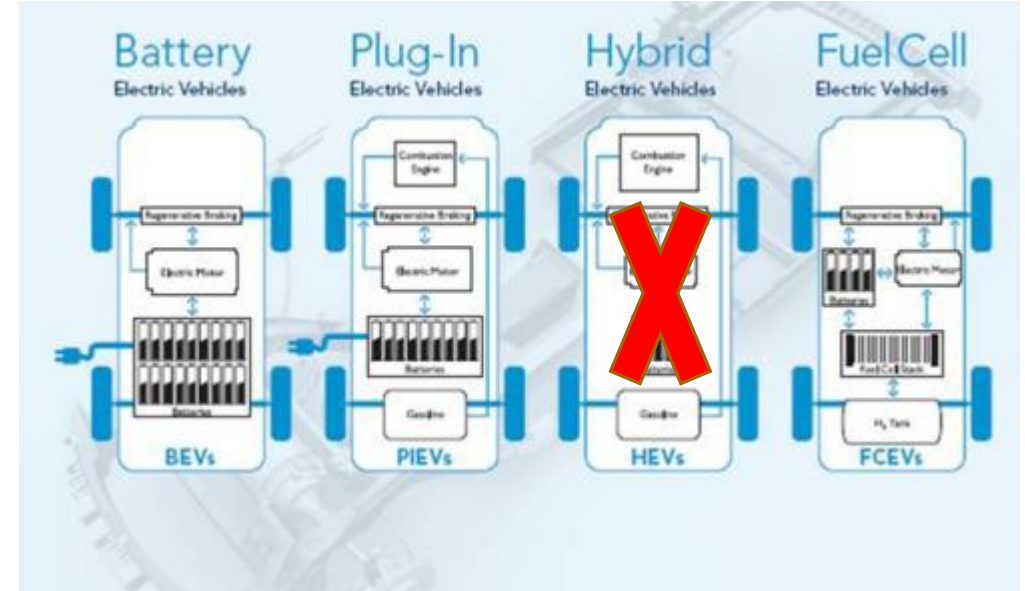


Reality - Class 2B to 8

# Zero Emission Vehicle ACF Definition

## Zero Emission Vehicle (ZEV) Types

- Battery Electric Vehicles (BEV)
- Hydrogen Fuel Cell Electric Vehicles (FCEV)
- Hybrid Electric Vehicles (HEV) Are Not ZEVs
- Plug-In Hybrid Electric Vehicles (PHEV) **Limited by All-Electric Range Requirement**



Phase 2 Plug-in Hybrid Electric Vehicles All-Electric Range Requirements and ATC Multipliers			
Vehicle Model Year	AER (miles)		ATC Multiplier
	Slow-Charge <sup>(1)</sup>	Fast-Charge <sup>(2)</sup>	
2017 - 2020	0	0	1.5 (Phase 1)
2021 - 2023	10+	10+	3.5 <sup>(3)</sup>
2024 - 2026	20+	15+	3.5 <sup>(3)</sup>
2027+	35+	20+	3.5 <sup>(3)</sup>

**Notes:**

<sup>(1)</sup> Slow-charge refers to Level 1 and Level 2 chargers with electrical circuit rated up to 240 volts AC, up to 80 amps, and 19.2 kilowatts.

<sup>(2)</sup> Fast-charge compatible PHEVs must: 1) be capable of charging from 15 percent state-of-charge to 85 percent state-of-charge within one-half hour (0.5hr); and 2) demonstrate that typical operating time is at least 8 times (8x) typical charging time (i.e., a vehicle must be capable of operating for 8 minutes for each minute of charge time).

<sup>(3)</sup> If the PHEV AER is less than that specified in the AER column for the respective vehicle model year, an ATC multiplier of 1.5 would be applicable if the PHEV complies only with subparagraph (k)(7)(ii)(A) of this section.

[https://ww2.arb.ca.gov/sites/default/files/2022-09/Phase%20202019%20version\\_0.pdf](https://ww2.arb.ca.gov/sites/default/files/2022-09/Phase%20202019%20version_0.pdf)

Vehicle Manufacturers are currently focused on producing “Low Hanging Fruit” classes such as:

- Delivery Vans, Mini-Buses, Cargo Trucks, Transit Buses, and Trucks for Intrastate Commerce
- Vocational (work) Truck Designs are Forecast to be Available Beginning in 2026

# ACF State and Local Government - Exempted Vehicles

## Non-Repairable Vehicles

- Flexibility to purchase **used** replacement ICE vehicle in case of accident. **Has to be same model year of newer.**

## Intermittent Snow Removal Vehicles

- May purchase ICE vehicles **until 2030.**

## Backup Vehicle Exemption

- Excludes vehicles operated less than 1,000 miles per year.

## Excluded From Fleet Requirements

- School buses
- Transit buses
- Military tactical vehicles
- Vehicles awaiting sale
- Emergency vehicles\*
- Dedicated snow removal vehicles
- Historical vehicles
- Heavy cranes
- Two-engine trucks and workover rigs
- Vehicles subject to Mobile Cargo Handling Equipment regulation



\*Authorized emergency vehicles as defined in California Vehicle Code Section 165

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**All exemptions have data collection and documentation requirements**

# Exempted Vehicles Emergency Vehicle Definition

## California Vehicle Code

### Sec. 165

An authorized emergency vehicle is:

- (a) Any publicly owned and operated ambulance, lifeguard, or lifesaving equipment or any privately owned or operated ambulance licensed by the Commissioner of the California Highway Patrol to operate in response to emergency calls.
- (b) Any publicly owned vehicle operated by the following persons, agencies, or organizations:
  - (1) Any federal, state, or local agency, department, or district employing peace officers as that term is defined in Chapter 4.5 (commencing with Section 830) of Part 2 of Title 3 of the Penal Code, for use by those officers in the performance of their duties.**
  - (2) Any forestry or fire department of any public agency or fire department organized as provided in the Health and Safety Code.
- (c) Any vehicle owned by the state, or any bridge and highway district, and equipped and used either for fighting fires, or towing or servicing other vehicles, caring for injured persons, or repairing damaged lighting or electrical equipment.
- (d) Any state-owned vehicle used in responding to emergency fire, rescue, or communications calls and operated either by the Office of Emergency Services or by any public agency or industrial fire department to which the Office of Emergency Services has assigned the vehicle.
- (e) Any vehicle owned or operated by any department or agency of the United States government when the vehicle is used in responding to emergency fire, ambulance, or lifesaving calls or is actively engaged in law enforcement work.
- (f) Any vehicle for which an authorized emergency vehicle permit has been issued by the Commissioner of the California Highway Patrol.

**Public Works vehicles are not exempt.**



# Waste and Wastewater Utilities & Transit Fleet Provisions

Provides more time for Waste and Wastewater fleets that are implementing organic waste diversions programs

- Must be exclusively fueling vehicles with Bio-Methane.
- **Defers ZEV requirement to 2030** for eligible fleets who elect to use the ZEV Milestone compliance path.

## Transit Fleet Exemption

This provision temporarily excludes Transit agencies **until 2030** who are subject to the ICT regulation

- This provides more time until ZEV purchases begin for their maintenance and support vehicles allowing them to focus their efforts on electrifying the transit buses first.





# ACF State and Local Government – Vehicle Exemption Process

A List of Truck Types that are Exempt from the ZEV Purchase Requirement if Not Available as a ZEV or NZEV (Near Zero Emission Vehicle) will be published on the CARB ACF website.

- CARB staff have **until 1/1/2025** for the list to be made available on the ACF website.
- Vehicles on the list can be purchased as an ICE vehicle without an exemption request application.
- **The list will not include pickups, buses, box trucks, vans, or any tractors.**
- Initially vehicle exemption requests will be used by CARB staff to develop the list of exempt truck types.

## Individual Fleet Exemption Process

- Fleets can submit an exemption request application if a ZEV is not available for a specific body configuration, or a ZEV cannot meet operational range and duty cycles.
  - Data and documentation is required to be included in the exemption request.
  - CARB will have 45 days to confirm approval by email.
    - **There is currently no appeal process to dispute an exemption being declined.**

# ACF State and Local Government – Infrastructure Extensions

## Construction Infrastructure Extension Requests

- Extension Request for construction delay for **up to 2 years.**
  - Construction delay must be due to circumstances beyond the fleet owner's control.
    - Includes delays related to fueling equipment.
    - An executed contract must already be in place for ZEV fueling infrastructure installation including construction permits issued at least 1 year prior to the next applicable regulatory reporting compliance date.
  - Examples of circumstances causing a construction delay:
    - A change in General Contractor.
    - Delays in the manufacture and shipment of ZEV fueling infrastructure equipment.
    - Delays in obtaining power from an electric utility provider.
    - Unexpected safety issues on the project.
    - Discovery of archeological, historical, or tribal cultural resources described in the California Environmental Quality Act, Public Resources Code Division 13, Section 21000.
    - Natural Disasters.

# ACF State and Local Government – Infrastructure Extensions

## Construction Infrastructure Extension Requests – Continued

- A ZEV purchase agreement **must be entered into prior** to submitting an Extension Request
  - **A ZEV could be delivered and need to be stored for up to 2 years** until the infrastructure installation is completed.
- Extension Requests must be submitted **at least 45 calendar days prior** to the next applicable compliance date for the CARB Executive Officer to consider the request.
  - Documentation is required with Extension Requests.
  - Extension Requests must be submitted by email to the [TRUCRS@arb.ca.gov](mailto:TRUCRS@arb.ca.gov) email address.
- CARB will have 45 days to confirm approval by email.
  - **There is currently no appeal process to dispute an exemption being declined.**

# ACF State and Local Government – Infrastructure Extensions

## New Site Electrification Delay Extension Requests – Until 1/1/2030

- Site Electrification Extension Requests are to align the estimated ZEV delivery date with the amount of time the electric utility determines it needs to supply the required power to a site.
- Extension Requests for delays **up to 5 years**.
  - The initial Extension Request for delays is for **up to 3 years**.
    - A subsequent Extension Request may be approved for **up to 2 years**.
      - The subsequent Extension Request is when an electric utility cannot supply the needed power by the end of the initial Extension Request time period.
      - The Extension Request must be submitted **at least 45 calendar days prior** to the expiration of the initial extension period.
  - **A ZEV could be delivered and need to be stored for up to 5 years** until the infrastructure installation is completed.
- The Fleet owner may request an extension for the number of ZEVs for which the electric utility cannot supply sufficient power to support.
  - The Fleet owner is required to **deploy the maximum number of ZEVs** that the site can support.
  - To maintain the Extension, the Fleet owner **must deploy an additional ZEVs** that can be supported by electric utility upgrades to the site's electrical capacity each calendar year during the delay until the project is complete.

# ACF State and Local Government – Infrastructure Extensions

## New Site Electrification Delay Extension Requests – Continued

- The Fleet owner may request an extension for the number of ZEVs for which the electric utility cannot supply sufficient power to support.
  - The Fleet is **required to deploy the maximum number of ZEVs** that the site can support.
- Extension requests must be submitted by email to the [TRUCRS@arb.ca.gov](mailto:TRUCRS@arb.ca.gov) email address.
- Documentation is required with Extension Requests.
- CARB will have 45 days to confirm approval by email.
  - **There is currently no appeal process to dispute an Extension Request being declined.**

**Both Extension Requests types require a Fleet to begin planning 1 year ahead for infrastructure installation.**



# Procurement – Requirement to Hire Compliant Fleets

Beginning on **1/1/2024** Fleets will be required to hire or dispatch ACF “Compliant Fleets”.

- The **first reporting** of ZEV compliance requirement for hire fleets deadline is **4/01/2025**.
- Provided hired fleets are purchasing ZEVs to meet their 2024 regulatory requirements, they will be in compliance up until **3/30/2025**.

Compliant Fleets are private or government agency fleets in compliance with the ACF regulation at the time they are hired and throughout the term of any contract or agreement or exempt from the ACF regulation.

Any High Priority or Federal Fleet that meets any of the following four criteria are required to comply with the ACF regulation:

1. Is an entity that has **\$50 million or more in total gross annual revenues**, including revenues from all subsidiaries, subdivisions, and branches, reported to the United States Internal Revenue Service, or its equivalent in another country in the calendar year immediately preceding the prior to the current calendar year;
2. Is a fleet owner that owns, operates, or directs the operation of **50 or more vehicles in the total fleet**, excluding light-duty package delivery vehicles;

# Procurement – Requirement to Hire Compliant Fleets

3. Is a fleet owner or a controlling party whose fleet in combination with other fleets operated under common ownership and **control totals 50 or more vehicles in the total fleet**, excluding light-duty package delivery vehicles; or
4. Is any federal government agency, or is a State or local government agency as defined in title 13, California Code of Regulations (CCR) section 2013(b) that has **elected to comply with the ZEV Milestones Option** specified in section 2015.2 pursuant to title 13, CCR section 2013(e).

## Examples:

- Rental Car or Truck Companies – Rental agreement is for less than one year.
- Vehicle Leasing Companies - Lease agreement is for less than one year.
- Trucking Companies- Hired to pickup or deliver large goods.
- Contracted Non-Government Organizations (NGOs) delivering services or goods.
- General Contractors.
  - **Subcontractors are excluded, but CARB has yet to release a FAQ confirming this exception**

# Procurement – Requirement to Hire Compliant Fleets

## Continued Examples:

- Facility Repair Businesses
  - Equipment Rental Businesses
  - Bottled Water Delivery Businesses
  - Uniform Cleaning Service and Delivery Businesses
  - Food Delivery Businesses
  - Moving Businesses
  - Fuel Delivery Businesses
  - People Transport Businesses or Government Agencies
  - Public Works Contracted Businesses
  - Etc.
- **Exception: Private or Government Agency Fleets that are exempt from the ACF regulation**



# Procurement -Compliant Fleets Reporting Requirements

## Verification of ACF Compliance

1. Check for verification that each fleet that will be hired or dispatched is listed on the CARB ACF webpage as a Compliant Fleet.
2. Acquire a statement from fleets that are not listed on the ACF webpage that their fleet is not subject to the High Priority and Federal Fleets and the State and Local Government Fleets regulation.
3. Collect and retained verification documents and attestation statements on a Calendar year basis.
4. Cannot hire or dispatch a fleet that does not meet steps 1 and 2 above.

# Procurement – Disclosure of Regulation Applicability to Hired or Dispatched Fleets

Provide disclosure of ACF compliance requirement in writing

- Include in regulatory language in new hiring or dispatch contracts or agreements
- Incorporate regulatory language as an addendum to existing hiring or dispatch contracts or agreements

- Required Regulatory Language

*“Vehicles with a GVWR greater than 8,500 lbs. and light-duty package delivery vehicles operated in California may be subject to the California Air Resources Board Advanced Clean Fleets regulations. Such vehicles may therefore be subject to requirements to reduce emissions of air pollutants. For more information, please visit the CARB Advanced Clean Fleets webpage at <https://ww2.arb.ca.gov/our-work/programs/advanced-clean-fleets>.”*



# Procurement – Sales Disclosure of Regulation Applicability

Provide disclosure of ACF compliance requirement in writing to purchaser of a vehicle

- The required regulatory language must be disclosed on or with the Bill of Sale, sales contract addendum, or invoice.
  - Required Regulatory Language

*“A vehicle operated in California may be subject to the California Air Resources Board Advanced Clean Fleets regulations. It therefore could be subject to requirements to reduce emissions of air pollutants. For more information, please visit the CARB Advanced Clean Fleets webpage at <https://ww2.arb.ca.gov/our-work/programs/advanced-clean-fleets>.”*

- Contracts with auction companies should be amended to require the ACF regulatory language.

# Procurement – Recordkeeping Requirements

- Must keep records of reported information required and documentation for a **period of 5 Years**
- Records must be available in electronic or paper format to CARB Staff **within 72 hours of a written or verbal request for audit**
  - Examples:
    - Vehicle purchase, rental, and leasing documents, such as purchase agreements, purchase orders, notices to proceed, leasing agreements, or rental agreements for vehicles.
    - If a vehicle is sold or consigned to an auction house, a copy of the contract and the Transfer of Liability form filed with DMV, if applicable.
    - Operator documentation - fleet owners must keep documentation identifying the entity responsible to pay the driver who is not a state or local government agency employee and any applicable shipping documentation or other documentation that identifies the origin and destination of the cargo and the pick-up and termination destination of the cargo.

# Procurement – Recordkeeping Requirements

## Continued Examples:

- **Documentation for Mutual Aid Assistance**
  - **Fleet owners that utilize the Mutual Aid Assistance Exemption must keep copies of all documents, mutual aid agreements, and letters submitted to CARB to support their request and qualifications for the exemption.**
- **Hiring Entity Documentation**
  - **Hiring Entities must keep certificates of reported compliance or signed statements received from Hired Fleets used to verify that Hired Fleets are compliant with the applicable regulations. Additionally, hiring entities must keep copies of contracts with Hired Entities that include the disclosure of regulation applicability.**

# Procurement – Recordkeeping Requirements

## Continued Examples:

- **Sales Disclosure Documentation**
  - Fleets must keep a copy of the written sales disclosure.
- **State and Local Government Fleet Regulatory Enforcement**

The government agency and individual employees who fail to comply with the requirements of the regulation, who fails to submit any information, report, or statement required by the regulation, or who knowingly submits any false statement or representation in any application, report, statement, or other document filed, maintained, or used for the purposes of compliance with the regulation may be subject to penalties.
- **Penalties**
  - **Financial penalties range from a minimum of \$500 to a maximum of \$1,171,000 per violation.**
  - **Individuals may be charged with a misdemeanor and not more than one year in county jail.**

# Annual Fleet Reporting Requirements

## Reporting Deadline and End Date

- Fleet owners must submit an annual compliance report **no later than April 1<sup>st</sup> of each year** through to year 2045 as the fleet is composed as of January 1 of the corresponding calendar year.
- The annual reporting period is during the month of March.
- The **initial report** must be submitted by **April 1, 2024**.
- Beginning January 1, 2025, fleet owners that submit initial reporting information after the initial reporting deadline specified are subject to penalties.
- Fleet vehicle data will be submitted to CARB through the TRUCRS Reporting System.
  - [https://ssl.arb.ca.gov/trucrs\\_reporting/login.php](https://ssl.arb.ca.gov/trucrs_reporting/login.php)

# Annual Fleet Reporting Requirements

## Required Information and Data for Each Fleet Vehicle

- VIN;
- Vehicle make and model;
- Vehicle model year;
- Vehicle license plate number and state or jurisdiction of issuance;
- Vehicle GVWR (Greater than 8,500 lbs. and equal to or less than 14,000 lbs., greater than 14,000 lbs. and equal to or less than 26,000 lbs., or greater than 26,000 lbs.);
- Vehicle body type;
- Fuel and powertrain type;
- Date vehicle purchase was made;
- Date vehicle was added to or removed from the California fleet;
- Whether the vehicle will be designated under or was purchased pursuant to any exemption or extension
- Odometer, or if applicable, hubodometer readings:
- **Engine family and engine model year** for any vehicles added to the California fleet after January 1, 2024;



# Annual Fleet Reporting Requirements

## Required Information and Data for Each Fleet Vehicle - Continued

- Funding contract start and end date for vehicles purchased with California State-funding if the vehicle is to be excluded during the funding contract period as specified by the funding program.
- ZEV Purchase Reporting
  - Fleet owners that are replacing a vehicle pursuant to the ZEV Purchase Exemption specified in section 2013.1(d) must identify which vehicle is being replaced.
- Joint Compliance Reporting
  - If an agency chooses to comply jointly as specified in section 2013(k), each individual department, division, district, subsidiary, or agency must report separately, and include the CARB-issued ID number of the primary controlling agency or designated primary entity.
- Emergency Mileage
  - The fleet owner must report the number of miles travelled in support of the emergency for backup vehicles used in emergency operations that would exceed the backup vehicle mileage limit.

# Annual Fleet Reporting Requirements

## Required Information and Data for Each Fleet Vehicle - Continued

- Changes to an Existing Fleet -Adding or removing vehicles from the California fleet:
  - Vehicles added to the California fleet **must be reported within 30 calendar days** of being added to the fleet;
  - Vehicles that are permanently removed from the fleet **must be reported within 30 calendar days** of removal. The report must include the date of removal;
  - If a backup vehicle exceeds the allowable mileage limit the change **must be reported within 30 calendar days** of the date the mileage limit was exceeded; and
  - ZEV Conversions. Fleets that convert a vehicle to a ZEV must report the vehicle's new fuel type **within 30 calendar days of being converted.**

# Annual Fleet Reporting Requirements

## Required Information and Data for Each Fleet Vehicle – Continued

- **Backup Vehicle Odometer or Hubodometer Reading Reporting.**
  - **Odometer Readings.** Report annually the odometer reading from January 1 of the current calendar year and the date the reading was recorded from a properly functioning odometer or hubodometer.
  - **Odometer Failure and Replacement.** If the vehicle's originally equipped odometer has failed and is replaced, report the following information within 30 calendar days of the date the original **odometer failed or was replaced**, whichever comes first: the original odometer's final reading, the new odometer's initial reading, and the date of replacement.
    - **Hubodometers.** If the vehicle's originally equipped odometer has failed and is not being replaced, the fleet owner must equip the vehicle with a hubodometer. Fleet owners **must report the serial number of the hubodometer within 30 calendar days** of the date the hubodometer was installed.

# Regulatory Language and Reference Documentation

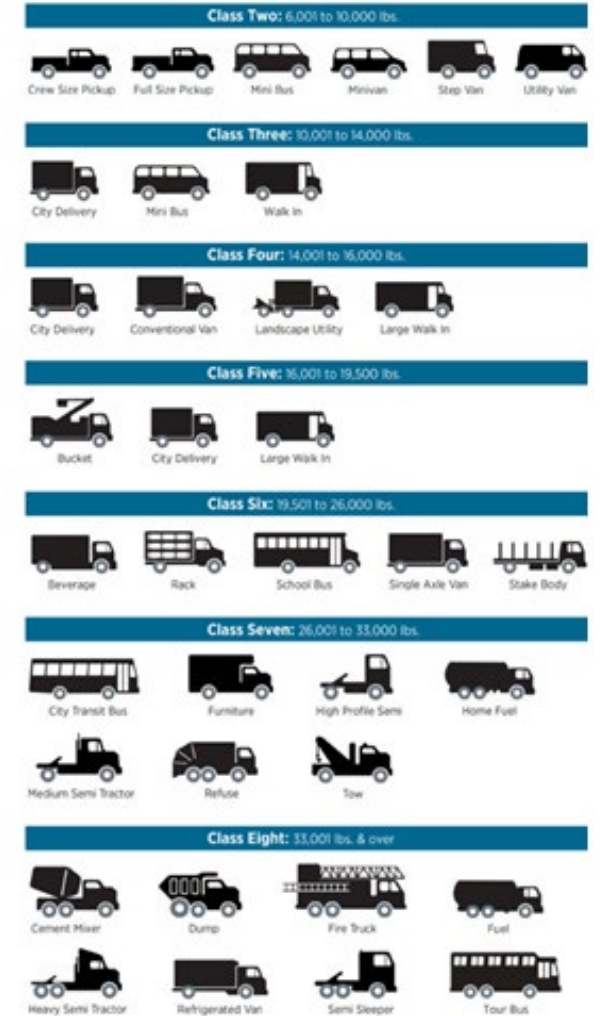
## CARB ACF Regulatory Language Website

- Main website
  - <https://ww2.arb.ca.gov/our-work/programs/advanced-clean-fleets>
- Final Regulation Order: State and Local Government Agency Fleet Requirements Document
  - <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2022/acf22/acffroa1.pdf>
- Final Regulation Order: High Priority and Federal Fleet Requirements
  - <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2022/acf22/acffroa2.pdf>

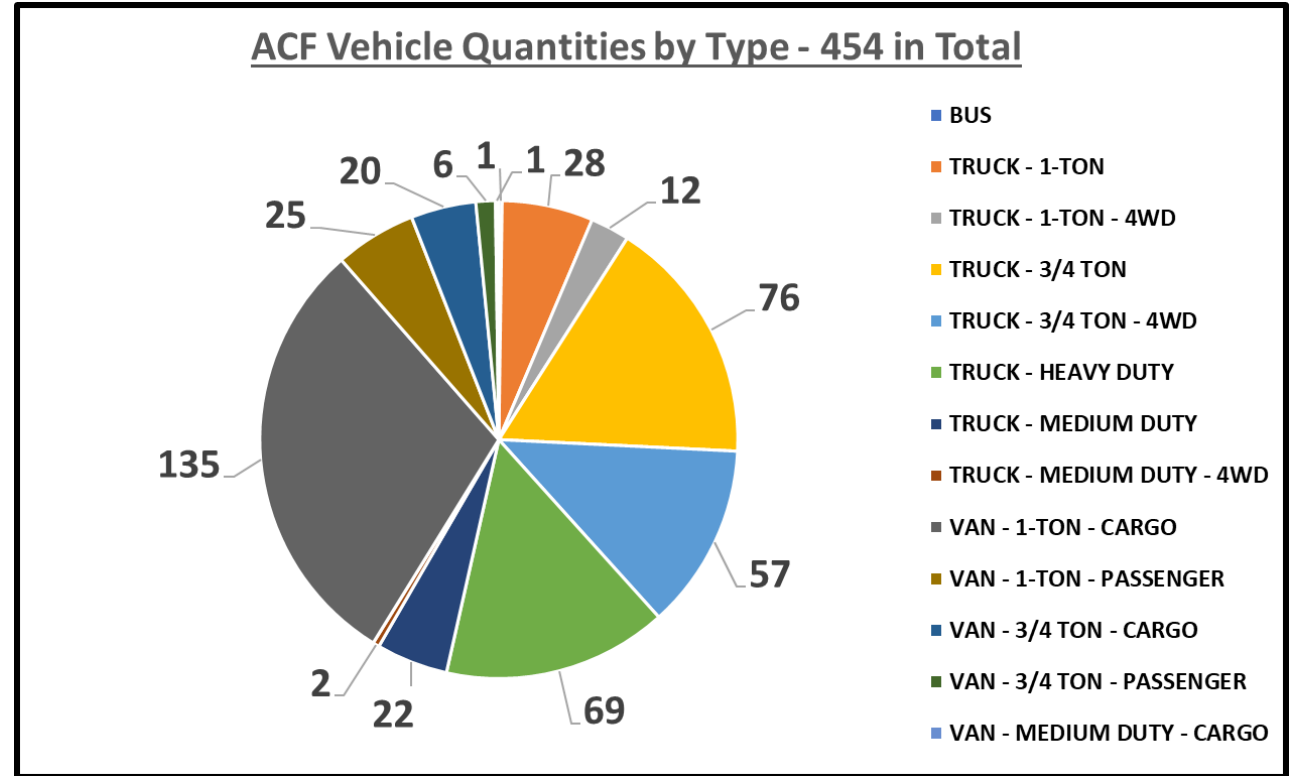
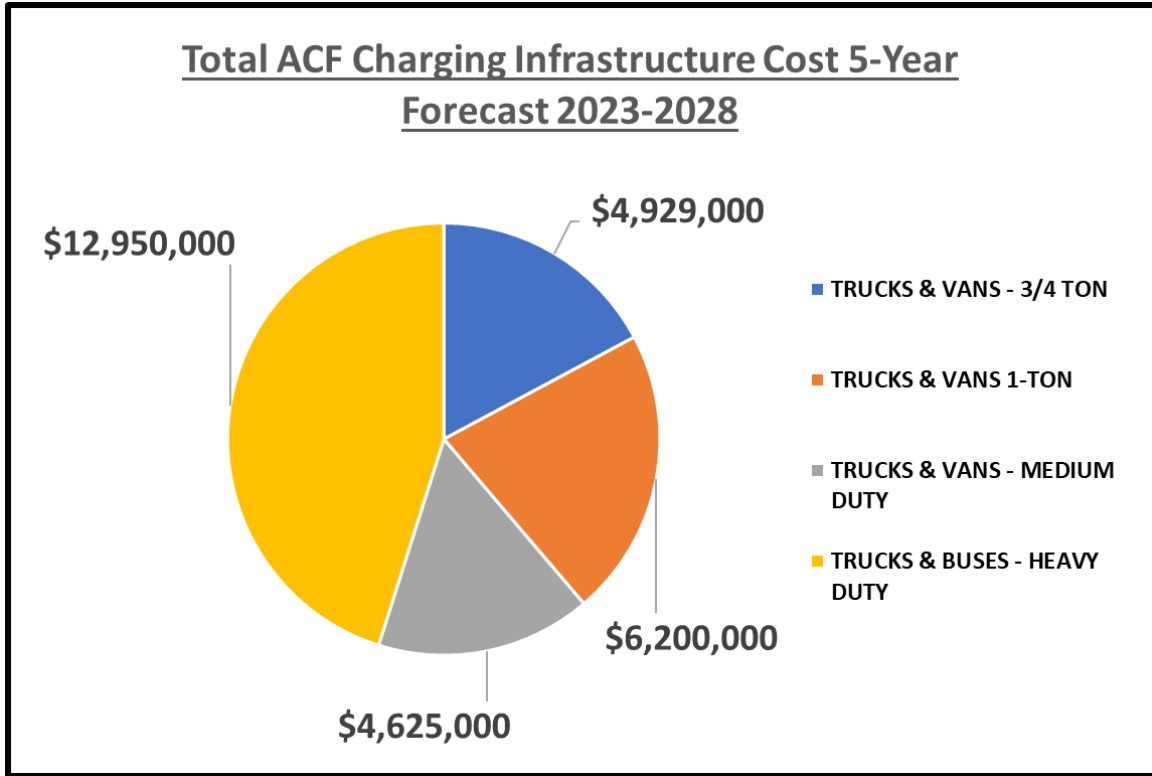
# ZEV Refueling Infrastructure Planning

## Example:

- Decentralized Fleet covering an operational area of 1,300 square miles
- 454 – Trucks, Vans, SUVs, and Specialty Truck Designs
- 47 – Overnight Parking Locations
  - 39 – Owned Facility Locations
  - 8 – Leased Facility Locations
  - 12 – Facilities Lack Sufficient Local Grid Capacity to Meet Charging Needs
  - 1 – Facility has no excess local grid capacity
- Most vehicles will need to be charged between 6 and 10 hours per day
  - Charge time dependent upon
    - Charging station kWh rating
    - Maximum kWh each vehicle can accept
    - kW size of vehicle battery module



# Charging Infrastructure Cost Example



5-Year Forecast Cost of **\$28,704,000** for **infrastructure only**. Does not include the acquisition cost delta for ZEVs



# Public Hydrogen Fuel Infrastructure

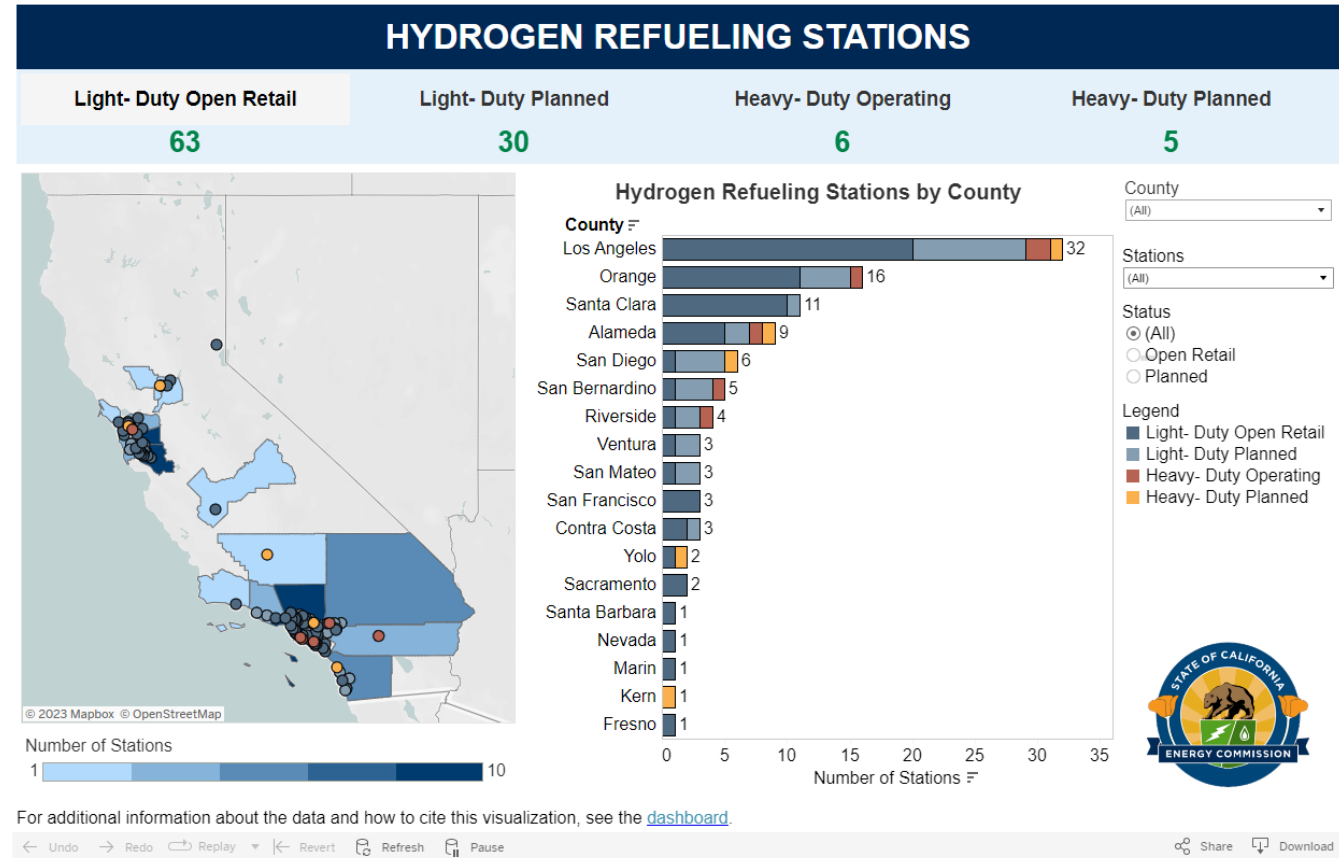
## EXAMPLE: Greater San Jose Public Hydrogen Fueling Stations\*

- 1 - Campbell
- 1 - Cupertino
- 3 - San Jose - 1 **Offline**
- 1 - Saratoga
- 1 - Sunnyvale – **Offline**

### Future Stations

- 1 – Los Gatos
  - Going Through Permitting Process
- 1 – San Jose
  - Going Through Permitting Process
- 1 – Los Altos
  - Going Through Permitting Process

**\* The Current Stations Are Not Designed to Support Medium/Heavy Duty Truck Usage**



Since 2009 Only 79 Public Stations Have Been Installed and Are Operational  
 There are Over 10,000 Public Gasoline, Diesel, CNG and Propane Stations  
 On Average 20% of the Public Station Every Day are Offline for Various Reasons

# Hydrogen Fuel Infrastructure Costs

## **\$1.5M to \$7M Per Station Cost**

- **Does Not Include Land Purchase**
- **They are Maintenance Intensive as Compared to a Gasoline or Diesel Station**
  - **More Costly to Maintain Operationally Than a CNG Station**
- **Medium/Heavy Duty Trucks Require a Higher Compressed Pressure (10,000 PSI) to Achieve Maximum Range**
  - **More Expensive Station Design at the Upper \$7M Per Station Cost Range**

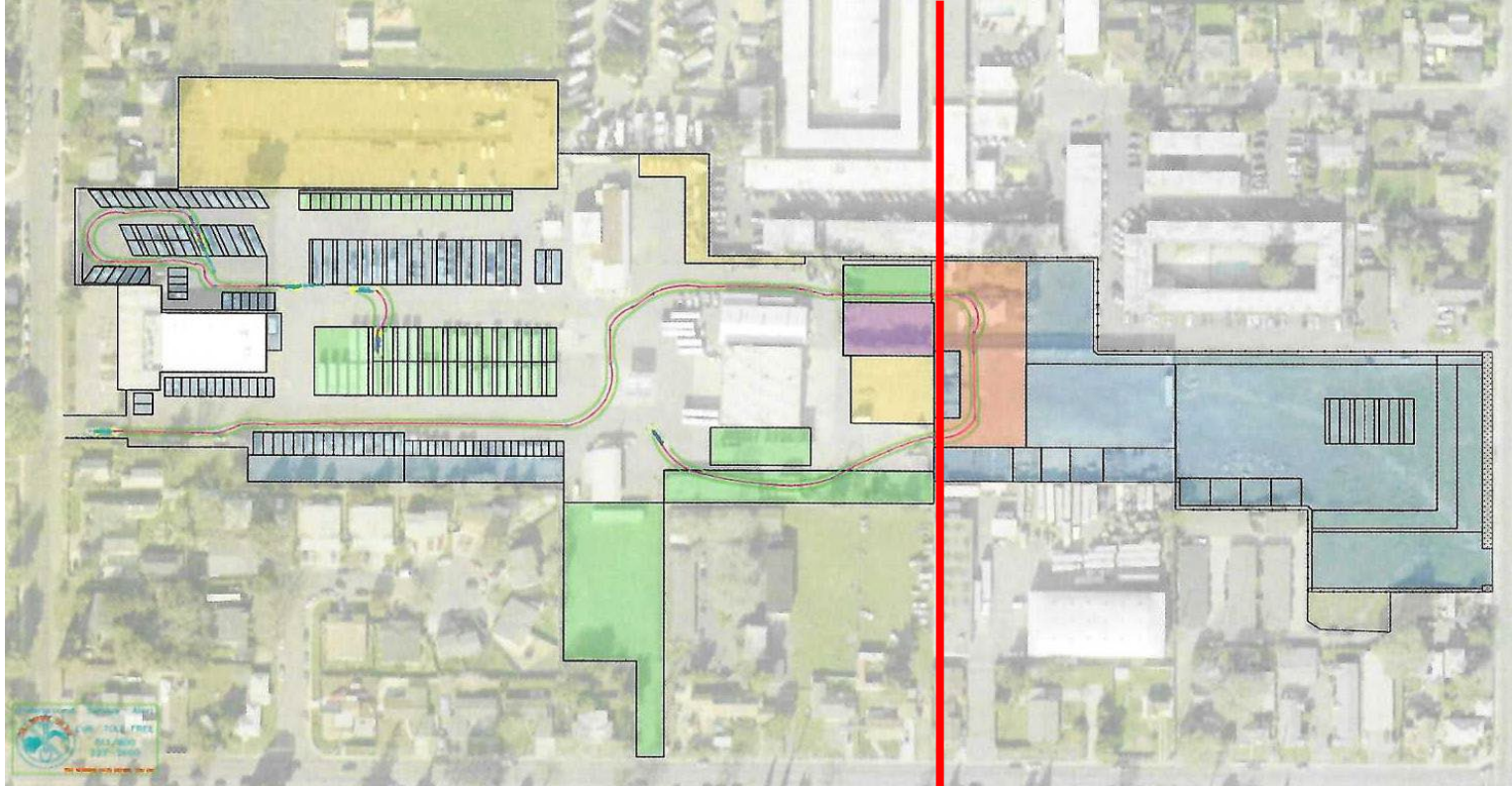
## **Current Public Hydrogen Stations are Better Suited for Sedans and Light Duty Trucks**

- **Fuel Cost Per Mile is 2.5X to 5X More Costly than Gasoline or Diesel Fuels Depending on the Vehicle Design**

## **Deployment of Hydrogen FCEV Trucks in the Fleet are Dependent on Manufacturer Availability and Public Refueling Infrastructure**

- **2026 – Medium Truck Applications Will be Available that Will Meet Some Applications and Duty Cycles**

# Overall Compliance Cost Example



Charging Infrastructure, New Buildings, Facility Improvements, Vehicles, and Back-Up Power

# Operational Challenges – Temporary Charging & Back Up Power



Battery Trailer Charging Station



Propane Powered Generator Charging Station



Mobile Onsite Charging



Solar Powered Charging Station



Hydrogen Fuel Cell Generator Microgrid Charging Station



# Operational Challenges – Infrastructure



Long Runs of Trenching = Expensive



Reduced Parking - During Construction



Reduce Parking – Permanent



High Voltage/Amperage Underground Vaults = Expensive



Charging Equipment Protection



# Operational Challenges - Facilities



**Employee Safety - 10' Clearance  
Between EV and Closest Metal  
Object Possible?**



**Maintenance Facility - Vehicle to Roof  
Clearance Sufficient?**



**Employee Safety – Additional 10' of  
Clearance Between Insulated Fall Protection  
Work Platforms and Closest Metal Object**



# Operational Challenges - Training

Training:	Training Program Development:	Job Classifications:
<ul style="list-style-type: none"><li>• Providers</li><li>• Hi-voltage systems</li><li>• Vehicle operations</li><li>• First response</li><li>• Fall protection</li><li>• First aid</li><li>• Electric Vehicle Supply Equipment (EVSE) training.</li></ul>	<ul style="list-style-type: none"><li>• Develop SOP's</li><li>• Training implementation plan</li><li>• Tracking</li><li>• Recurrence</li><li>• Train the trainer!</li></ul>	<ul style="list-style-type: none"><li>• HV Level I Technician</li><li>• HV Level II Technician</li></ul>

**Trainings Costs – Onsite, Out of State, Minimum # of Hours, Etc. After Training - Mechanics/Technicians Will Still Need High Voltage Arc Flashing Training**

# Operational Challenges – Safety Training



**Tow Truck Operator Safety Training**

**Vehicle Manufacturer (OEM), National Fire Protection Association (NFPA) 70E, OSHA 1910.302-308, and OSHA 1910.269 Training**

- Regulations & Training
- High Voltage Safety Hazards
- Work Practices & Responsibilities
- Electrically Safe Work Condition
- Safety Grounding
- Signage Requirements
- High Voltage Safety Equipment
- Live Line Tools
- Personal Protective Equipment
- Barricading
- Rules & Policies

**Job Description Changes  
High Voltage - Mechanic, Technician, and  
Facilities Employee Training and Certifications**



**High Voltage Safety Training**

# Operational Challenges

## Take-Home Trucks

- Commute mileage uses up battery range
- Charging at an employee's residence is not realistic
- Emergency operations can be ongoing for days limiting recharging opportunities

## Charging Session Electricity Interruptions – Restart?

- Is someone notified via an email of interruptions in power?
- Are staff on hand to restart charging stations?
  - Does the charging station or vehicle restart a charge sessions automatically when electrical power is restored?

## Do you have a back-up plan for 3 days of power outages?

- Do you have alternative locations with unaffected localize electrical grids to charge vehicles?



# Vehicle Design Challenges - Upfitting

- Upfitting limitations depending on vehicle trim level package?
- Can additional pieces of equipment be grounded to the frame?
- Are there amperage restrictions on what additional electrical load can be added to truck?
- Are there restrictions on where electrical equipment can be connected to the truck's 12-volt system?
- Can auxiliary 12-volt batteries be added to the truck?
  - Where and how can they be added?
- Where can equipment be mounted?
  - What panels can be drilled through?
- What happens when the 12-volt battery is discharged?
  - Does the powertrain system lock up like a smart phone in a "brick" mode?
  - Does the truck need to be towed on dollies only?



# Vehicle Design Challenges - Upfitting

## Self-contained auxiliary power units as an option

- How do you charge them?
  - Additional charging infrastructure needed?
    - Charge the vehicle first and then charge an auxiliary power unit?
- Is the design compatible with the truck chassis?
- Where can it be mounted?
  - Above, between, outside or underneath frame rails?
  - Within a body compartment?





# EV Accident Damage

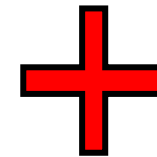
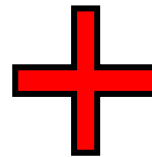
- **California Vehicle Registrations – 2022 Data**
  - 36,229,205 Vehicle Registered
  - 425,300 EVs Registered
    - 1.01% of Vehicles Registered are EVs
- **Vehicle Fire Data**
  - 1 in 1,500 chance of a vehicle catching fire in the United States
  - 1 in 20,000 chance of a Tesla EV catching fire in Europe
- Current EV fire data is insufficient to determine proper safety protocols for every scenario
- A single EV on fire can need as much as 40,000 gallons of water to extinguish it
- EV fires can require a Haz Mat response – You may be billed for the costs - \$5K to \$20K
- Dedicated containment systems may be necessary to store damaged EVs as a safety precaution
- Simple accident damage may require battery module/box replacement, effectively “totaling” the vehicle



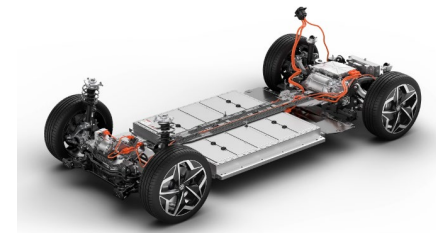
# EV Accident Damage – First Responders

## First Responders.

- Police
- Fire
- Tow Truck Drivers
- Fleet Staff



- In many cities unless there are injuries, gasoline or fluids from the vehicles, or they are blocking a major throughfare, Police dispatchers will direct the vehicle operators/owners to exchange contact, insurance, and driver license information and then call a tow company to remove the vehicles from the accident scene.
- Vehicle undercarriage damage is not seen, and this is where many vehicle battery modules are located.
  - Skateboard design
- Damage to an EV battery module may not develop into a fire for days or weeks.



# EV Battery Fire Examples



An Electric Scooter Taken On Board the Bus Caught Fire and Spread to the Rest of the Bus. The Bus Hybrid Electric Battery was Intact After the Fire



An EV Bus Caught Fire and It Spread to Adjacent Buses

Firefighters Utilized Dry Chemical Extinguisher and Foam to Put Out this Fire

EV Bus Fire Damages Depot



# Accident Damage – EV Fire Containment



- Light Duty EV Trucks require a 50' radius between the vehicle and the next closest object in case of a fire
- Medium/Heavy Duty Truck radius requirements may be greater
- An EV Truck will need to remain in quarantine for between 48 hours and 2 weeks depending on the manufacturer's recommended safety protocols
- A majority of towing vendors do not have space to meet manufacturer recommended safety protocols for just one EV sedan

# Accident Damage – EV Fire Containment



- The EV needs to be parked on concrete, asphalt, or gravel away from combustible material such as grass and weeds.
- EV battery fires can reach temperatures of up to 1,400 degrees Fahrenheit.
- Surface modifications at this facility will provide a quarantine location for two EVs at a time.
- Contracted towing providers will be directed to take all damaged EVs to this location.
- EV Accident Repair Damage Costs are 27% to 43% Higher than conventional vehicles.



# Accident Damage – EV Fire Containment



Runoff water may contain hazardous chemicals that can trigger a HAZMAT response if the contaminated water threatens to enter a storm drain or Creek.

First Responders may decide that letting the EV burn out is the best strategy.

# Operational Impacts – ZEV Warranties

## Charging Infrastructure Installation Delays

- **ZEV Warranties**
  - The start of a warranty may be when the ZEV is delivered and not when it is put into service
  - Infrastructure installation delays can cause a ZEV to need to be stored after delivery for up to five years
    - It is unlikely that a ZEV manufacturer will delay the beginning of a battery warranty for up to five years after delivery
- **Infrastructure Exemptions can exist for up to 5 years**
  - Does a ZEV in storage need the tires replaced due to age?
  - Software upgrades while in storage
  - Storage facility costs
  - Maintaining battery module voltage
  - Changes in charging technology or connectors



# Challenges – Battery Module Replacement

- Will future replacement battery modules be backwards compatible?
- Will vehicles need to be replaced because battery modules and control systems are not backwards compatible or cannot be retrofitted?
- Battery cost per kWh reduction advancements may not decrease older battery module replacement costs

QUANTITY SHIPPED	PART NUMBER	DESCRIPTION	PRODUCT CODE	UNIT PRICE	AMOUNT
	15GGE301691091768	SYSTEM SHUT DOWN ISSUES , POSSIBLE HYBRID PROBLEMS SYSTEM SHUT DOWN ISSUES , POSSIBLE HYBRID PROBLEMS STORAGE ASSEMBLY - ENERGY UNIT BUS HAS ACTIVE DTC 76-21 & 77-71 ALSO ESS DTC 3161-15 AND 3171-15 . DTC FOR HIGH SUBPACK RESISTANCE INDICATES ESS NEEDS REPLACING . REMOVED OLD ESS AND INSTALLED A NEWW ESS . RECALIBRATED THE BUS AND TEST DROVE . CUSTOMER BILLABLE ALLISON POLICY 9.69-00 GENRAL OPERATIONS 2 9.69-01 T/S & DIAG .5 9.65-01 RECAL ECU 1 9.64 -00 TEST DRIVE .5 04000040 R&R ESS 4			
1	29550278	STORAGE ASSEMBLY - ENERGY	ALLISON	44,547.77	44,547.77 *

08/2012 – Battery Module Replacement Cost

Line #	Description	Parts	Lab
	<b>Complaint:</b> Remove ESS and install new ESS assembly.  <b>Cause:</b> ESS expired battery life.  <b>Correction:</b> Receive bus from customer. Connect DOC and record snapshot. Remove ESS from bus. Install new ESS assembly. Perform SID calibration and test drive.		
	<b>Parts:</b>		
1	New ESS assembly	\$82,365.37	
2	AC Access cover gasket	\$22.73	

11/2022 – Battery Module Replacement Cost

# Capital and Budgetary Costs

**ZEV Trucks Cost 1.5X – 5X More than conventional powered trucks.**

- **Costs highly dependent upon class of vehicle and duty cycles.**
- **\$90K to \$1M each.**
- **Limited amount of cost data is available.**

**Purchase of additional vehicles because available designs can't meet current fleet vehicle duty cycles or towing requirements.**

**Charging Infrastructure - \$35K to \$200K per charging station depending on voltage and amperage needs.**

**Additional charging infrastructure needed to recharge electric auxiliary equipment on truck bodies.**

- **Cranes, generators, compressors, aerial units, welders, hydraulic pumps, etc.**

**Mobile recharging vehicles or trailers for remote work sites or Public Safety Power Shut-Offs – Cost up to \$1M each.**

**Facility electrical capacity upgrades to support refueling EVs.**

# Capital and Budgetary Costs

## Facilities

- Higher lease rate costs

## Human Resources

- **New Facilities Positions**
  - To manage charging station infrastructure maintenance, repairs, warranties and regulatory compliance.
  - To research, apply for, and manage the administration of grants, rebates, and vouchers funding source requirements.
- **New Fleet Positions**
  - **New Job Classification to ZEV Research, Specification Development, and Regulatory Compliance**
    - To research available ZEV technology, vehicle designs, specialty body designs, develop specifications, and manage ACF regulatory compliance.
    - Submit and manage ACF regulatory extensions and exemptions for vehicles that there is no currently available ZEV equivalent in the marketplace or where supporting EV charging station infrastructure installations are delayed.



# Capital and Budgetary Costs

## Human Resources - Continued

- **New Fleet Job Classifications for the Repair and Maintenance of ZEVs**
  - **High Voltage Safety Disconnect and ARC Flash training and certifications**
  - **Contact Release Safety Training and Certification**
  - **Repair work related to vehicle High Voltage Battery System and components**
- **Update Fleet Job Classifications for the Repair and Maintenance of ZEVs**
  - **Normal maintenance and repair work not related to High Voltage Battery System and components**
  - **Contact Release Safety Training and Certification**
- **Update Facility Job Classifications for the Diagnosis, Repair, and Maintenance of EV Charging Stations and Supportive Infrastructure**
  - **High Voltage Safety Disconnect and ARC Flash training and certifications**
  - **Contact Release Safety Training and Certification**
  - **Repair work related to charging stations and high voltage electrical infrastructure**



# Capital and Budgetary Costs

## Human Resources - Continued

- **Other Challenges**
  - **Pay scale increases**
  - **Bargaining unit negotiations**
  - **Talent pool availability**
  - **Industry wide mechanic / technician shortage**
  - **Phase-In of positions**

## Procurement Department

- **Collection, tracking, and management of vendor certificates and contracts that require the use of an ACF applicable vehicle for providing services the government agency.**
- **Higher public works project costs as private fleets pass on their compliance costs and operational impacts.**



# Compliance Strategies

## Milestone Pathway vs ZEV Purchase Requirements as Part of Normal Vehicle Replacement Planning

- **Repair vs replacement until infrastructure is in place**
  - **Delaying vehicle replacement is limited by SB-1**
    - SB1 chapter states:
      - 43021.
        - (a) Except as provided in subdivision (b), the retirement, replacement, retrofit, or repower of a self-propelled commercial motor vehicle, as defined in Section 34601 of the Vehicle Code, shall not be required until the later of the following:
          - (1) **Thirteen years from the model year the engine and emission control system are first certified for use in self-propelled commercial motor vehicles by the state board or other applicable state and federal agencies.**
          - (2) When the vehicle reaches the earlier of either 800,000 vehicle miles traveled or 18 years from the model year the engine
          - [https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill\\_id=201720180SB1](https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB1)
- **Prepurchase of current EPA certified engine vehicles – Limited vehicle productions**



# Funding Resources

**NOTE:** Beginning on **1/1/2024**, vehicles acquired with California State incentive program funding for ZEVs or NZEVs **will not be counted as a compliant vehicle** during the contract period if the general program requirements state that funding cannot be used for compliance requirements.

- All funding program requirements need to be reviewed in depth to prevent unintended use restrictions.

## CARB Website Incentives & Funding

- <https://ww2.arb.ca.gov/our-work/programs/truckstop-web-resources/zev-truckstop/incentives-funding>

## Advanced Vehicle Technology and Infrastructure Funding Finder Tool

- <https://fundingfindertool.org/>

## Hybrid & Zero-Emission Truck & Bus Voucher Incentive Program (HVIP)

- <https://californiahvip.org/>

## Low Carbon Fuel Standard

- <https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard>

## EnergiIZE Commercial Vehicles

- <https://www.energiize.org/>

## Truck Loan Assistance Program

- [Truck Loan Assistance Program | California Air Resources Board](#)

# Funding Resources - Continued

## **Carl Moyer Program**

- <https://ww2.arb.ca.gov/our-work/programs/carl-moyer-memorial-air-quality-standards-attainment-program>

## **Low Carbon Transportation Investments Program**

- <https://ww2.arb.ca.gov/our-work/programs/low-carbon-transportation-investments-and-air-quality-improvement-program>

## **Volkswagen Environmental Mitigation Trust**

- <https://ww2.arb.ca.gov/our-work/programs/volkswagen-environmental-mitigation-trust-california>

## **Voucher Incentive Program (VIP)**

- <https://ww2.arb.ca.gov/our-work/programs/road-heavy-duty-voucher-incentive-program>

## **Community Air Protection Incentives for On-Road Heavy-Duty Vehicles**

- <https://ww2.arb.ca.gov/our-work/programs/community-air-protection-incentives>

# Funding Resources – Cost Savings Example



- Applies to Battery Electric Vehicles (BEV) and Plug-In Hybrid Vehicles (PHEV) over 6K lbs. Gross Vehicle Weight Rating (GVWR)
- Funding Summary
  - PG&E covers all costs up to the electrical meter.
  - Rebates for approved charging stations.
  - Rebates for approved electric vehicles.
  - **Fleet pays for all infrastructure costs after the electrical meter.**
- 11 Sites considered for program that meet PG&E's requirements.
  - 1 Site removed from consideration due to no additional infrastructure is needed to the meter.
  - 46 Charging Ports
    - 22 DC Charging Station Ports
    - 24 Level 2 AC Charging Station Ports

# Funding Resources – Cost Savings Example

- Funding is tied to commitment to purchase BEVs, PHEVs, and charging stations and have operational by 2026
- PG&E's commitment to each site is based on contract signatures being received **ASAP**.
  - Requirement to enter into contract within 30 days.
  - Potential for another program applicant to take up all existing grid capacity at individual locations until contracts are signed.

## Total Project Estimated Costs

- **\$ 2,198,398** - PG&E Costs – **40%** of total project costs covered by PG&E
- **\$ 3,222,591** - County Estimated Costs

# More Information

- Sign up for emails for the latest news about the CARB ACF regulation.
  - <https://ww2.arb.ca.gov/our-work/programs/advanced-clean-fleets>



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CARB is developing a medium and heavy-duty zero-emission fleet regulation with the goal of achieving a zero-emission truck and bus California fleet by 2045 everywhere feasible and significantly earlier for certain market segments such as last mile delivery and drayage applications.

[MORE ABOUT THIS PROGRAM >](#)

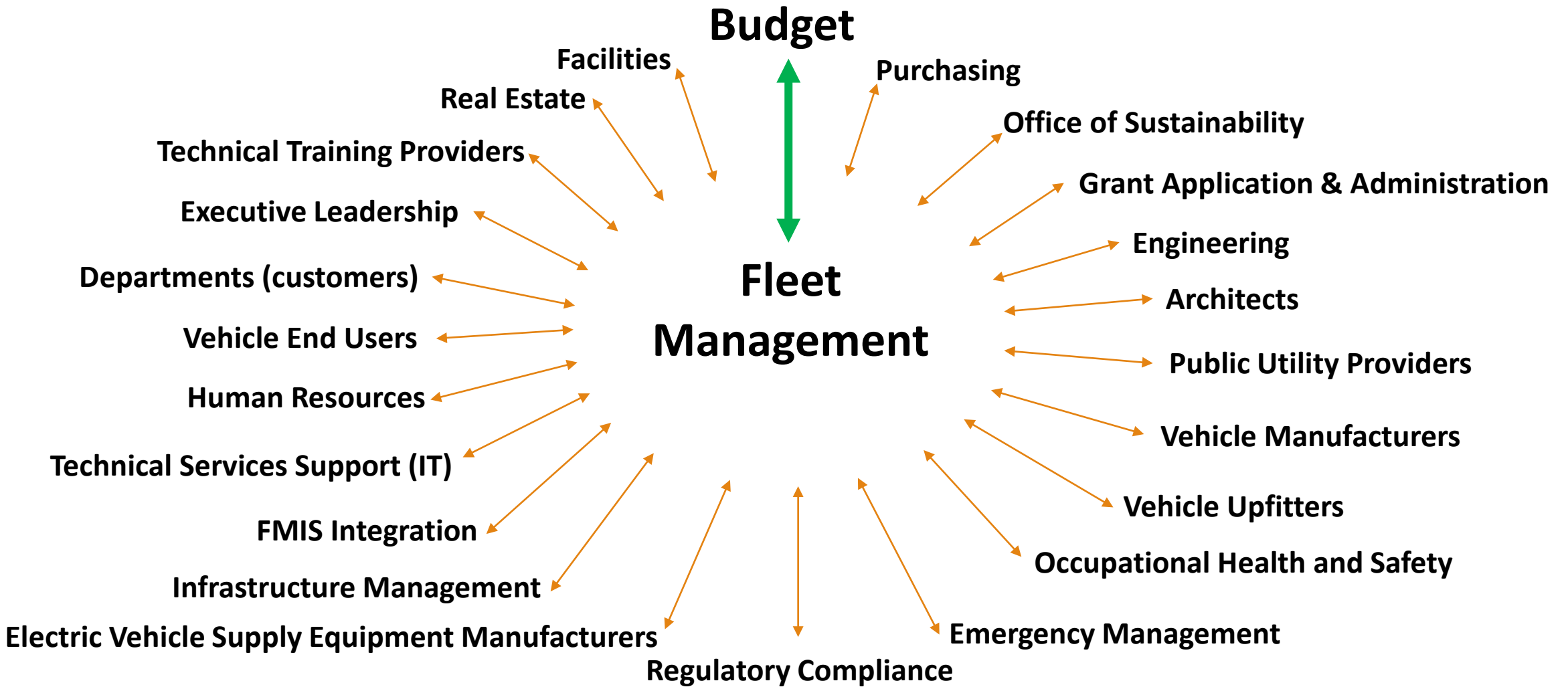
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Keep up to date on future meetings and important events for the Advanced Clean Fleets regulation by signing up for our email updates.

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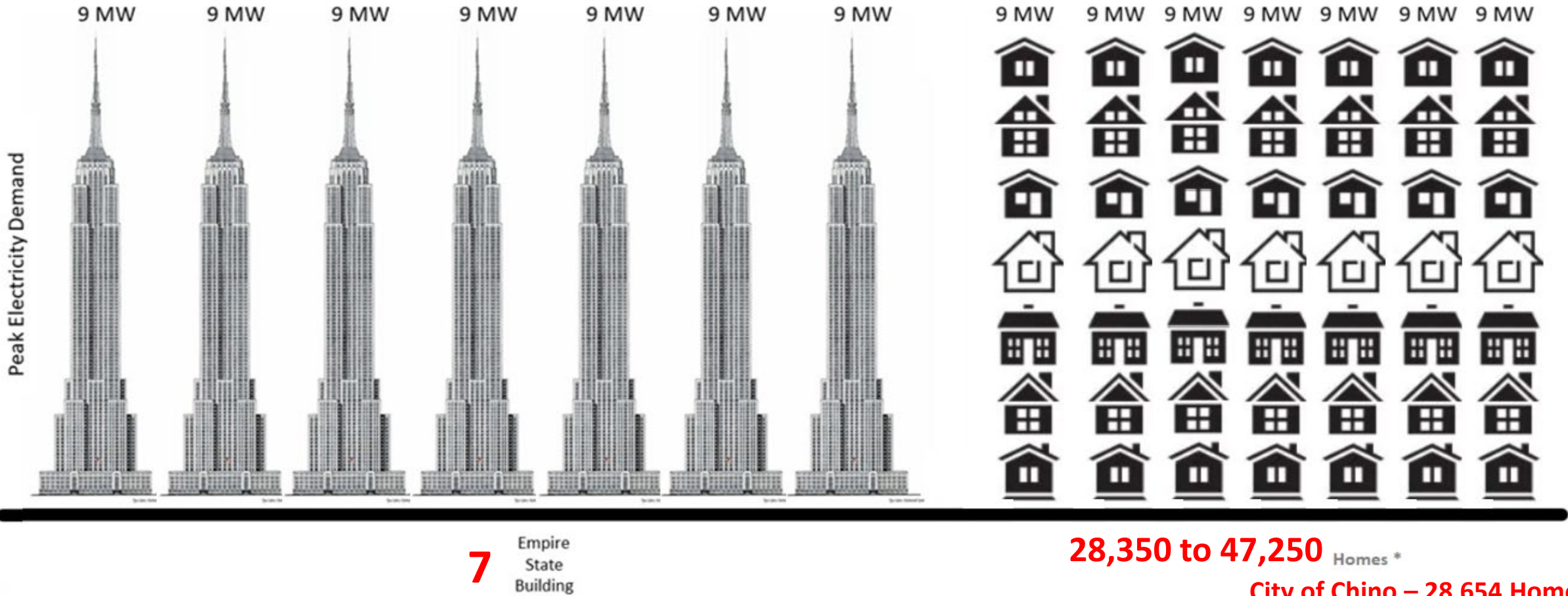


# Internal and External Group Collaboration Required





# Electric Charging Infrastructure Example – 454 Trucks Daily Electricity Consumption



City of Chino – 28,654 Homes  
City of Concord – 47,816 Homes

\* Varies Between 350 – 750 Homes per MW Depending on Location in U.S. and Size of Home





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# Thank You to the Clean Cities Coalitions and Fleet Associations that Made this Webinar Possible

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