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Joint Comments of Earthjustice, CCAEJ, and EYCEJ

Additional submitted attachment is included below.

June 11, 2020

California Energy Commission
Docket Unit, MS-4
1516 Ninth Street
Sacramento, California 95814-5512
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Re: Docket No. 20-IEPR-02, ZEV Market Trend

Dear California Energy Commission Staff:

On behalf of East Yard Communities for Environmental Justice and the Center for Community Action & Environmental Justice, we provide comments on the Transportation track of the 2020 Integrated Energy Policy Report Update ("IEPR" or "IEPR Update"). Electrifying transportation is a critical issue that the California Energy Commission ("Commission") is pursuing. Sending the correct signals on the scope of transportation electrification necessary to meet community health protection, air quality, and climate goals is of paramount importance for Californians. These comments focus on the sectors beyond light-duty passenger electrification. This is not to diminish the importance of electrification of the light-duty sector, but rather to elevate the health imperative of tackling harmful, even deadly emissions, from the freight industry. Our recommendation is that the Commission expand the scope of transportation electrification activities that its infrastructure assessments plan to support in the *2020 IEPR Update* so that they cover the breadth of health-harming freight emissions, and expand the scale of its assessment to meet the State's crucial 2045 carbon-neutrality goals.

I. Freight Pollution Endangers Public Health and Economic Growth: Transformative Action Is Necessary.

California's energy agencies are uniquely positioned to influence the growth of a sustainable freight system in California. Senate Bill ("SB") 350 directs utilities and the Public Utilities Commission to prioritize "widespread transportation electrification" as a necessary step toward complying with state law and attaining ambient air quality standards.[1] Meeting the requirements set in SB 350 will dramatically reduce greenhouse gas emissions, improve public health, and advance the transformation of California's transportation sector. However, understanding the true scope of investments in transportation electrification by our energy agencies has been a significant short-coming. The *2020 IEPR* provides a critical moment in California to set the correct signals on the scope necessary to meet California's goals.

[1] Pub. Util. Code § 740.12(a)(2).

A. Meeting Clean Air and Climate Standards Requires Aggressive Freight Emissions Reductions.

Freight pollution is the largest obstacle to meeting federal clean air standards and state greenhouse gas emission reduction requirements. California is home to two of the most polluted air basins in the country: the San Joaquin Valley and the South Coast air basin. Both air basins are in nonattainment of federal particulate matter and ozone standards and are facing ozone attainment deadlines in 2023 and 2031 as well as particulate matter attainment deadlines between 2021 and 2025. As Figure 1 demonstrates, the South Coast cannot attain federal air quality standards without drastic reductions in emissions from the freight sector.[2] The San Joaquin Valley faces a similar challenge.

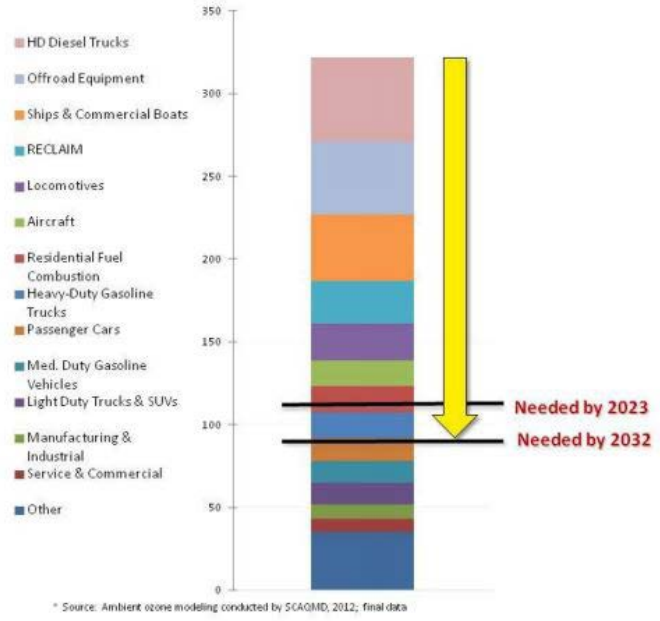

Figure 1. NOx emissions needed to meet federal 8-hour ozone air quality standard.

Diesel emissions account for much of the South Coast and San Joaquin Valley's challenges in attaining air quality standards. Emissions from on-road heavy duty vehicles alone account for 31% of all nitrogen oxides (NOx) emissions in the South Coast air basin; NOx is a precursor to particulate matter and ozone formation.[3] In the San Joaquin Valley, on-road heavy-duty vehicles account for 41% of all NOx emissions.[4] Neither of those figures includes emissions from other freight vehicles and equipment, such as off-road equipment like yard trucks, forklifts, and gantry cranes.

The transportation sector is also the largest contributor to California's annual emissions of climate change-inducing greenhouse gases. The sector accounts for more than half of the

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[2] South Coast Air Quality Management District. "Final 2012 Air Quality Management Plan," at 4-19 (February 2013) (available at: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2012-air-quality-management-plan/final-2012-aqmp-(february-2013)/main-document-final-2012.pdf).

[3] California Air Resources Board. CEPAM: 2016 SIP – Standard Emission Tool South Coast Air Basin (Accessed June 10, 2020) https://www.arb.ca.gov/app/emsinv/cepam_emssumcat_query_v5.php http://www.arb.ca.gov/app/emsinv/2013/emssumcat_query.php?F_YR=2012&F_DIV=0&F_SEASON=A&SP=2013&F_AREA=AB&F_AB=SC).

[4] California Air Resources Board. CEPAM: 2016 – Standard Emission Tool San Joaquin Valley Air Basin (Accessed June 10, 2020) https://www.arb.ca.gov/app/emsinv/cepam_emssumcat_query_v5.php

state's GHG emissions when including upstream emissions.[5] Still, transportation sector emissions are rising, and freight movement's share of those emissions is increasing—freight emissions are projected to increase 30% by 2050, the fastest growth in GHG emissions of any sector.[6] Electrification of the entire transportation sector, from passenger vehicles to heavy-heavy duty trucks, is essential to meeting air pollution and greenhouse gas reduction standards. Paying particular attention to investments that advance the electrification of freight will result in significant public health and environmental benefits.

B. Current Efforts Are Off-Track for Meeting State Objectives or Climate Targets

The State's transportation electrification targets are too weak to meet our decarbonization objectives, and current policies are too weak to meet even those targets. For example, current policies are expected to yield 3.6 million EVs in 2030, short of the State's goal of 5 million EVs by 2030. Yet pathway studies by Southern California Edison indicate the State in fact requires 8 million EVs by 2030.[7]

The dynamic is similar in the medium- and heavy-duty (MD/HD) sectors—CARB's Mobile Source Strategy anticipates that meeting both near-term NOx reduction goals and long-term climate goals requires 21 percent of HD trucks on the road be ZEVs by 2031.[8] CARB's Proposed Advanced Clean Truck Rule would not reach that percentage until 2035.[9] Independent analysis by Lawrence Berkeley National Laboratory shows that the State's carbon-neutrality goals in fact require 100% ZEV sales by 2030 across *all* truck classes.[10]

Thus, it is not enough for the Commission to be reactive to the rulemakings or programs of its sister agencies, nor is it adequate to simply forecast ZEV deployment in each segment under a range of demand scenarios as it has done in past IEPR reports. The CEC's objective is not to plan for forecasted demand, but to enable necessary levels of deployment. **Therefore, the *2020 IEPR Update* must go beyond meeting the State's 2030 ZEV goals and assess deployment and infrastructure needs for actually achieving California's air and climate goals.** Under AB 2127, the Commission is to prepare an infrastructure assessment for the need to meet GHG reductions through transportation electrification across all vehicle categories (on and

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[5] California Air Resources Board. Initial Statement of Reasons – Advanced Clean Trucks Regulation (Oct. 22, 2019) at II-5 https://ww3.arb.ca.gov/regact/2019/act2019/isor.pdf).

[6] Andrew Goetz et al, Urban Goods Movement and Local Climate Action, Assessing Strategies to Reduce Greenhouse Gas Emissions from Urban Freight Transport, (April 2019) at 3 http://transweb.sjsu.edu/sites/default/files/1796_Goetz_Alexander_Urban-Goods-Movement-Greenhouse-Gas-Emissions.pdf

[7] Dawn Anaiscourt, Southern California Edison Company Comments on Draft Scoping Order for 2020 IEPR Update at 2 (available at: https://efiling.energy.ca.gov/GetDocument.aspx?tn=231890)

[8] CARB, 2020 Mobile Source Strategy, at 27 (https://ww3.arb.ca.gov/planning/sip/2020mss/pres_marwbnr.pdf).

[9] Jimmy O'Dea, The Biggest Step To-Date on Electric Trucks (Apr. 29, 2020) https://blog.ucsusa.org/jimmy-odea/the-biggest-step-to-date-on-electric-trucks

[10] Amol Phadke, Comments on Proposed Amendments to Advanced Clean Truck Rule (May 20, 2020) at 3 https://www.arb.ca.gov/lists/com-attach/3499-act2019-UiISPAYyUHMLam0D.pdf.

off-road). Examining infrastructure needs only for the 5 million ZEV by 2030 goals or the 40% reduction from 1990 levels by 2030 goal may not be sufficient to understand the infrastructure needs for carbon-neutrality or near-term air quality goals.

C. Freight Pollution Impacts Public Health and Economic Growth across the State.

The public health impacts of freight pollution underscore the importance of acting quickly to reduce emissions from freight. Warehouses, distribution centers, ports, railyards, and major roadways are concentrated in zip codes where the median income is far lower, and the percent of Black and Brown people is far higher, than the State average.[11] As a result, California subjects its most disadvantaged populations to much more severe health impacts from air pollution caused by freight. Evidence has demonstrated that this pollution is even more dangerous than we previously knew, particularly to children. In California's Draft Sustainable Freight Strategy, several agencies noted:

> Despite substantial progress over the last decade, the diesel equipment operating in and around freight hubs continues to be a significant source of air toxics that can cause localized risks of cancer and other adverse health effects. New health science tells us that infants and children are 1.5 to 3 times more sensitive to the harmful effects of exposure to air toxics than we previously understood, which heightens the need for further risk reduction.[12]

Moreover, ample research demonstrates that certain facilities pose even larger impacts because of the concentration of diesel equipment. Another study found that individuals living near four large railyards in Southern California experienced heightened cancer risks relative to others in the region. The study's results suggested that the heightened risk was tied to freight activity because decreased freight activity during the economic recession also resulted in decreased cancer risk for nearby residents.[13]

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[11] See, *e.g.* Pacific Institute, *Paying with Our Health: The Real Cost of Freight Transport in California*, (Nov. 2006) at 13 https://pacinst.org/wp-content/uploads/2013/02/paying-with-our-health-full-report.pdf

[12] "California Sustainable Freight Action Plan," at 6 (July 2016) (available at: https://ww2.arb.ca.gov/sites/default/files/2019-10/CSFAP_FINAL_07272016.pdf).

[13] California Cleaner Freight Coalition. "Vision for a Sustainable Freight System in California," at 12 (January 2016) (available at: http://www.ccair.org/wp-content/uploads/2016/01/CCFC-Vision-for-a-Sustainable-Freight-System-in-California.pdf); California Air Resources Board. "Supplement to the June 2010 Staff Report on Proposed Actions to Further Reduce Diesel Particulate Matter at High-Priority California Railyards," at 3 (Table 1) (July 2011) ("Railyard Commitments Report") (available at: http://www.arb.ca.gov/railyard/commitments/suppcomceqa070511.pdf); see also, South Coast Air Quality Management District. "Final Report: Multiple Air Toxics Exposure Study in the South Coast Air Basin," at 6-2 (May 2015) (available at: http://www.aqmd.gov/home/library/air-quality-data-studies/health-studies/mates-iv).

Other studies in Southern California have also identified heightened risks to residents near freight facilities.[14] In the Bay Area, research has found that West Oakland, the community closest to the Port of Oakland, is exposed to three times as much diesel particulate matter ("diesel PM") as other communities in the region.[15] West Oakland also has a higher percentage of people of color and low-income families than the Bay Area as a whole.[16] Imperial Valley residents breathe high levels of diesel PM as a result of trucks idling as they wait to cross the US-Mexico border. A study recently found that pollution from diesel trucks, rather than agricultural burning, is the largest source of air pollutants in Imperial Valley,[17] where communities are some of the most disadvantaged in California according to the state's CalEnviroScreen tool.[18] Targeting transportation investments toward reductions in freight emissions can benefit disproportionately impacted communities, in keeping with SB 350's goal of prioritizing communities that bear the brunt of California's air pollution.[19] **The *2020 IEPR Update* should emphasize the importance of investments in transportation electrification in heavily impacted communities.**

Emissions of greenhouse gases and criteria air pollutants both have significant economic implications for California, and reducing those emissions could mitigate those impacts. Meeting the federal ozone and particulate matter standards in the South Coast air basin would result in health benefits valued at over $21 billion dollars.[20] Another study found that failing to meet those standards in the San Joaquin Valley costs the region $6 billion per year, due to lost productivity, health impacts, and premature death.[21] The effects of climate change will also cost the state billions of dollars. Rising temperatures will increase energy costs and threaten the agricultural industry. By 2050, sea level rise will have claimed property valued between $8

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[14] *See, e.g.*, University of Southern California. "USC Children's Health Study: Study Findings" (available at: https://healthstudy.usc.edu/findings.php); South Coast Air Quality Management District. "Final Report: Multiple Air Toxics Exposure Study in the South Coast Air Basin" (May 2015) (available at: http://www.aqmd.gov/home/library/air-quality-data-studies/health-studies/mates-iv).

[15] California Air Resources Board. "Diesel Particulate Matter Health Risk Assessment for the West Oakland Community," at 2 (December 2008) (available at: http://www.arb.ca.gov/ch/communities/ra/westoakland/documents/westoaklandreport.pdf).

[16] Alameda County Public Health Department. "Life and Death from Unnatural Causes: Health and Social Inequity in Alameda County," at 45. (August 2008) (available at: http://www.acphd.org/media/53628/unnatcs2008.pdf).

[17] Patricia Leigh Brown. "The air is dark and deadly along the Mexico border," Reveal: the Center for Investigative Reporting (April 21, 2015) (available at: https://www.revealnews.org/article/the-air-is-dark-and-asthma-is-deadly-along-the-mexico-border/).

[18] California Environmental Protection Agency. "California Communities Environmental Health Screening Tool, Version 2.0 (CalEnviroScreen 2.0)," at 136 (October 2014) (available at: http://oehha.ca.gov/ej/pdf/CES20FinalReportUpdateOct2014.pdf).

[19] Pub. Util. Code § 454.52(a)(1)(H).

[20] Victor Brajer, Jane V. Hall, and Frederick W. Lurmann. Valuing Health Effects: The Case of Ozone and Fine Particles in Southern California. *Contemporary Economic Policy*, 29 (4), 524-535.

[21] Jonathan London, Ganlin Huang, and Tara Zagofsky. "Land of Risk, Land of Opportunity," at 4-5 (November 2011) (available at: http://www.ca-ilg.org/sites/main/files/file-attachments/report_land_of_risk_land_of_opportunity.pdf).

billion and $10 billion, if business as usual continues.[22] The *2020 IEPR Update* must articulate the necessary levels of electrification of the transportation sector to mitigate these economic harms, in addition to the serious environmental and health harms.

D. Articulating the Full Scope of Investments in Freight Transport Electrification Will Benefit Other State Initiatives.

The *2020 IEPR Update's* transportation electrification track can facilitate ongoing transportation electrification efforts in other state agencies by signaling the appropriate scope of zero-emission infrastructure needed to meet state goals. Other transportation electrification efforts include the development of California's State Implementation Plans for federal air quality standards, the multi-agency Sustainable Freight Action Plan development process, the California Air Resources Board's Mobile Source Strategy, and Regional Transportation Plans. The Commission has an important role to play in the implementation of these plans through the IEPR process. For example, at least one Metropolitan Planning Organization, the Southern California Association of Governments ("SCAG"), has identified advancing a zero emissions freight movement system as part of its transportation plan since 2012. The recently adopted transportation plan for 2020 notes the following:

> The 2012 RTP/SCS included a Technology Advancement Plan to develop and deploy a fully zero emission goods movement system in the 2035 timeframe. The 2016 RTP/SCS detailed progress and new action steps. Connect SoCal builds on these previous plans using lessons learned. The overall structure which traces the four stages of technology development and deployment, remains the same.[23]

Importantly, the 2020 SCAG Transportation Plan identifies infrastructure for zero emission freight as a critical issue that must be prioritized and addressed.

II. ELECTRIFICATION OF THE FREIGHT SYSTEM.

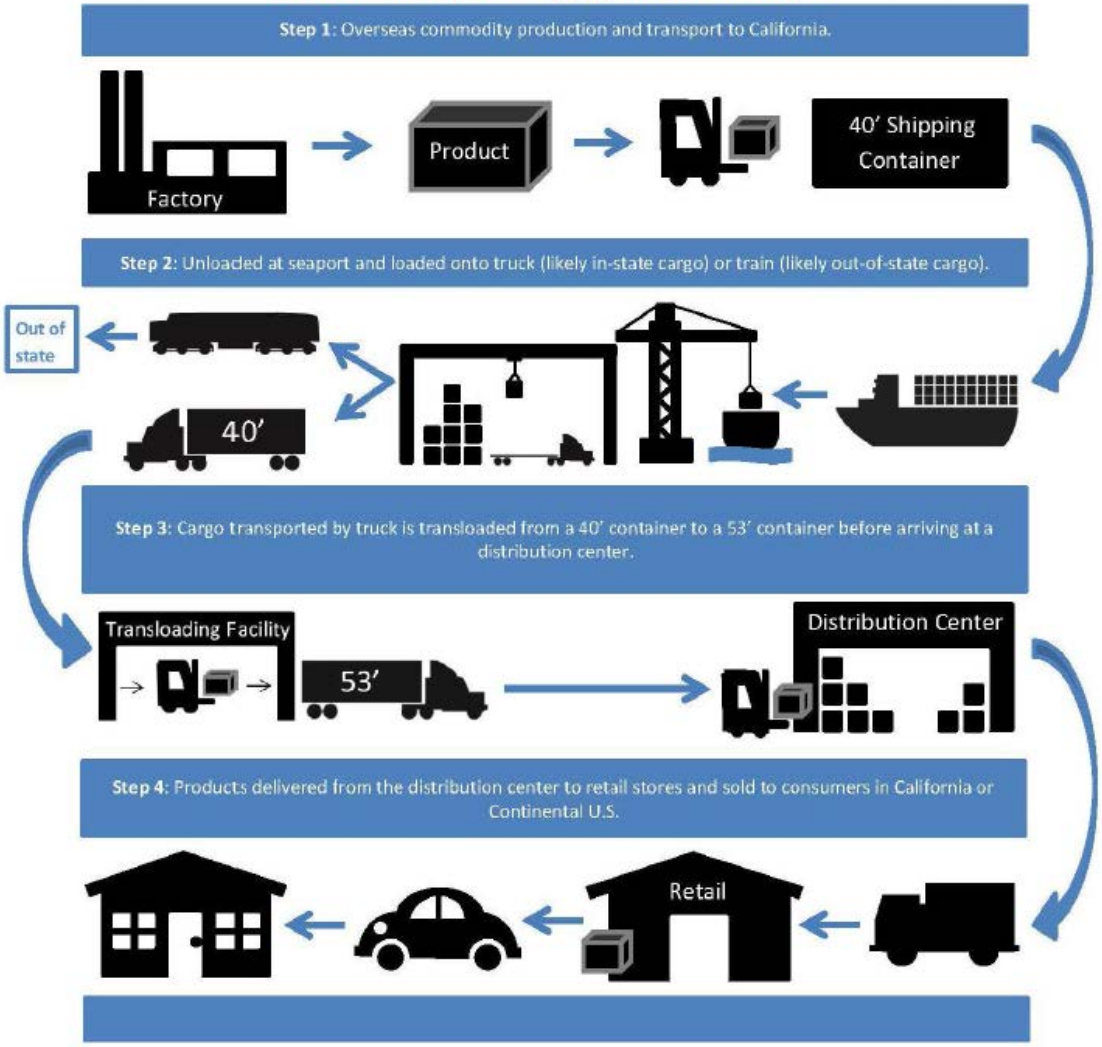
A. Overview of the Freight System.

The freight system is a vast network that touches virtually everything we use including food, clothing, and other goods. In simple terms, the freight system transports goods from factories to consumers and encompasses many different intermediate sites and modes of transportation. The freight system is comprised of a broad state-wide network of transportation elements involving marine ports, rail yards, airports, warehouses, distribution centers, and refineries. The freight system includes not only international goods movement, but also the movement of local and regional goods throughout California. The California Air Resources

[22] Risky Business Project. "From Boom to Bust? Climate Risk in the Golden State," at 4 (April 2015) (available at: http://riskybusiness.org/site/assets/uploads/2015/09/California-Report-WEB-3-30-15.pdf).
[23] SCAG, Connect SoCal Technical Report, Goods Movement, at 63 (May 7, 2020) (available at:

Board has offered a useful graphic for describing the various steps that may be involved in the transport of goods to consumers:[24]

FIGURE 1: Import Supply Chain Example



"California's freight transportation system differs significantly from our state's passenger vehicle environment, and will require different approaches to achieve [zero-emission vehicle] market penetration."[25] The type of technological transformation needed to address the pollution problems caused by freight will require the development of new markets for not only the end vehicles, but also for all of the components and technologies that will go into these advanced

[24] California Air Resources Board. "Sustainable Freight: Pathways to Zero and Near-Zero Emissions," at 9 (April 2015) (available at: http://www.arb.ca.gov/gmp/sfti/Sustainable_Freight_Draft_4-3-2015.pdf) (hereinafter "Sustainable Freight Strategy").

[25] Governor's Interagency Working Group on Zero-Emission Vehicles, "2015 Draft ZEV Action Plan," at 19 (April 24, 2015) (available at: https://www.gov.ca.gov/docs/DRAFT_2015_ZEV_Action_Plan_042415.pdf) (hereinafter "2015 Draft ZEV Action Plan").

vehicles. Development of these new manufacturing markets will be key to advancing these technologies and bringing down costs.

Policies to promote the electrification of this system must account for the variety in equipment and operations. Initial efforts should target those advanced technology vehicle types that are closest to commercialization (or that are already commercially available). This may mean starting with vehicle types that have limited ranges, and vehicle categories outside the freight system such as urban transit buses, where application duty-cycles and vehicle attributes such as weight and power requirements are similar to freight applications.[26] Focusing on the deployment of zero-emission technologies for the vehicle types where such technologies are closest to commercialization will help demonstrate the viability of these technologies for those equipment types that are farther behind in the development process, and will create the component manufacturing and supply chains that will be needed to support expanding advanced technologies to these other equipment types. Such action will enable the technology and market development that will support expansion to other categories of freight equipment. Examples of technologies where more rapid deployment of zero-emission technologies is possible include urban buses and shuttles, ground support equipment, forklifts, other on-port equipment, drayage trucks, and urban last-mile delivery trucks.[27]

But, the *2020 IEPR* is a forward planning document that must consider and provide the relevant information to plan for facilities and equipment that are harder to electrify such as railyards. The following section summarizes the state of zero-emission technologies for various freight-related vehicles and equipment.

[26] *See, e.g.*, Eelco den Boer, et al., CE Delft. "Zero emissions trucks: An overview of state-of-the-art technologies and their potential," at 101 (July 2013) (available at: http://www.theicct.org/sites/default/files/publications/CE_Delft_4841_Zero_emissions_trucks_Def.pdf) (hereinafter "CE Delft Report") ("[A]dvanced concepts are already being introduced in many countries for both urban bus transport and for the city distribution of goods. Therefore, policy incentives could first be directed to these urban applications and increasingly expanded to intercity and long haul applications after implementation success is seen in urban applications.").

[27] *See* California Air Resources Board, "Heavy-Duty Fuels and Technology Assessment," at 11-12 (Draft April 2015) ("ARB Tech. Assessment") (available at: http://www.arb.ca.gov/msprog/tech/techreport/ta_overview_v_4_3_2015_final_pdf.pdf).

B. Infrastructure Support Is Essential for a Broad Range of Freight Electrification Objectives

The California Air Resources Board is currently undertaking myriad regulations that will advance zero-emission transportation. The following chart summarizes this information:

Table 1: Implementation Schedule of CARB Zero-Emissions Mobile Source Measures

Rule	Year Enacted	First Compliance	Concept
Innovative Clean Transit[28]	2018	2023	Transitions roughly 12,000 transit buses statewide to ZE
ZE Airport Shuttle Rule[29]	2019	2022	Transitions roughly 1,000 shuttles at major State airports to ZE
ZE Ships At-Berth[30]	2020	2021	Requires ships to use shore-power at berth (recently strengthened to expand number of ships regulated--an additional 282 vessel calls will be regulated)
ZE Advanced Clean Trucks[31]	2020	2024	Sales mandate that would result in ~4% of trucks on the road being ZE by 2030. Board has directed Staff to strengthen the rule.
ZE Airport GSE[32]	2020	TBD	Transition all 3,050 pieces of GSE equipment to ZE
Rail Yard Idling[33]	2020	2023	Potential regulation to reduce idling emissions from all rail yard sources and emissions from other stationary locomotive operations.

[28] CARB, Innovative Clean Transit (ICT) Regulation Fact Sheet (accessed Mar. 4, 2020), https://ww2.arb.ca.gov/resources/fact-sheets/innovative-clean-transit-ict-regulation-fact-sheet.
[29] CARB, Zero-Emission Airport Shuttle Regulation (accessed Mar. 4, 2020), https://ww2.arb.ca.gov/our-work/programs/zero-emission-airport-shuttle.
[30] CARB, Ocean-Going Vessels At Berth (accessed Mar. 4, 2020), https://ww2.arb.ca.gov/rulemaking/2019/ogvatberth2019.
[31] CARB, Advanced Clean Trucks Regulation (accessed Mar. 4, 2020), https://ww2.arb.ca.gov/rulemaking/2019/advancedcleantrucks.
[32] CARB, Zero-Emission Airport Ground Support Equipment (accessed Mar. 4, 2020), https://ww2.arb.ca.gov/our-work/programs/zero-emission-airport-ground-support-equipment.
[33] CARB, Reducing Rail Emissions in California (accessed Mar. 4, 2020), https://ww2.arb.ca.gov/our-work/programs/reducing-rail-emissions-california.

ZE Transportation Refrigeration Units[34]	2020	2025	TRU fleets phase in (15 percent of purchases per year) and use ZE operation when parked or stationary.
Clean Miles Standard[35]	2021	2023	Sets a GHG target per passenger mile traveled and a target percent of VMT covered by electric vehicles for passenger service on transportation network company platforms.
Advanced Clean Cars 2	2020	2026	Requires auto-manufacturers to produce ZEVs as an increasing percentage of overall sales each year based on a credit system.
ZE Forklifts	2021	2023	Regulation requiring a transition to ZE forklifts
ZE Fleet Rule (Includes Drayage)[36]	2022	2024	100 percent ZE drayage by 2035. 100 percent ZE first/last mile delivery, refuse, buses, utility and government fleets by 2040. All truck segments feasible ZE by 2045.
ZE Cargo Equipment[37]	2022	2026	Regulation to transition cargo handling equipment to zero emissions for all mobile equipment at ports and railyards "including but not limited to: yard trucks, rubber-tired gantry cranes, container handlers, and forklifts."[38]

1. **Trucks.**

Zero-emission truck technology is commercially available for many vehicle applications, including urban delivery trucks. Battery electric engines are particularly well suited to the needs of urban delivery trucks.[39] Urban delivery trucks are driven short ranges on fixed routes, and the limited ranges of battery electric engines are sufficient for that application. They operate at

[34] CARB, New Transport Refrigeration Unit Regulation in Development (accessed Mar. 4, 2020), https://ww2.arb.ca.gov/our-work/programs/transport-refrigeration-unit/new-transport-refrigeration-unit-regulation.
[35] CARB, Clean Miles Standard (accessed Mar. 4, 2020), https://ww2.arb.ca.gov/our-work/programs/clean-miles-standard.
[36] CARB, Advanced Clean Truck Fleets (accessed Mar. 4, 2020), https://ww2.arb.ca.gov/our-work/programs/advanced-clean-fleets/advanced-clean-fleets-meetings-events.
[37] CARB, Cargo Handling Equipment Regulation to Transition to Zero-Emissions (accessed Mar. 4, 2020), https://ww2.arb.ca.gov/resources/documents/cargo-handling-equipment-regulation-transition-zero-emissions.
[38] CARB, Revised Freight Facility Concepts Advanced Materials (Mar. 14, 2018) at 7 https://ww2.arb.ca.gov/sites/default/files/2018-10/revised_freight_facility_concepts_advance_materials_03142018.pdf.
[39] California Hybrid, Efficient and Advanced Truck Center (CalHEAT), "Battery Electric Parcel Delivery Truck Testing and Demonstration" at 17 (August 2013) (available at: http://www.calstart.org/Libraries/CalHEAT_2013_Documents_Presentations/Battery_Electric_Parcel_Delivery_Truck_Testing_and_Demonstration.sflb.ashx).

moderate speeds, thereby maximizing battery life. They make frequent stops, allowing for regenerative braking to partially recharge the engine. They are driven during the day and parked at night, allowing for time to recharge batteries. As a result, they can produce cost savings for companies when used efficiently.[40] Companies have already begun adding battery electric delivery trucks to their fleets. Smith Electric's Newton trucks, for example, are currently being used by major corporations such as Staples and Coca Cola. Another Smith Electric customer, Frito Lay, has the largest fleet of all electric trucks, with 176 Smith Newton trucks.[41] UPS and FedEx have also added electric trucks to their delivery fleets.[42]

Ports are also currently evaluating zero-emission technology for drayage trucks and yard tractors – the trucks used to move containers from ships to nearby storage lots and the trucks used to move containers within a port. The Port of Los Angeles has been testing battery electric and fuel cell drayage trucks and yard tractors since 2009.[43] These demonstration projects have included trucks manufactured by TransPower and Balqon. Battery life and inverter performance has improved significantly at the Port of Los Angeles over the testing period. Because the Port has found recent data from zero-emission technology demonstration projects to be promising, it is planning for additional rounds of testing to evaluate how battery electric engines perform under a typical operating schedule.[44] On May 4, 2016, the Air Resources Board announced a $23.6 million initiative to fund 43 new zero-emission drayage trucks to be manufactured by BYD, Kenworth, Peterbilt, and Volvo.[45]

Technologies that enable "zero-emission miles" will also be important in the short-term as a means to reduce emissions and commercialize full zero-emission technologies. For example, overhead catenary systems can help provide additional zero-emission miles for conventional diesel heavy-duty trucks or for plug-in hybrid[46] or battery-electric heavy-duty trucks. Trucks can connect to catenary systems for part of their route, and travel via electricity instead of diesel. For battery electric vehicles or plug-in hybrid vehicles, the catenary systems help extend range by

[40] *Id.* at 5 ("Data showed that E-Trucks are more efficient than conventional diesel vehicles, with E-Truck efficiency being up to 4 times better than the fuel efficiency of similar diesel vehicles. E-Trucks are also cheaper to operate since they are more efficient and are generally fueled with cheap electricity.")
[41] See Smith Electric's website: http://www.smithelectric.com/.
[42] "Sustainable Freight Strategy," at 25.
[43] Port of Los Angeles. "Draft Zero Emission White Paper," at 10-11 (July 2015) (available at: https://www.portoflosangeles.org/pdf/Zero_Emmissions_White_Paper_DRAFT.pdf).
[44] *Id.* at 11.
[45] California Air Resources Board. "State Award $23.6 Million for Zero-Emission Trucks at Seaports (May 4, 2016) (available at: http://www.arb.ca.gov/newsrel/newsrelease.php?id=809).
[46] Volvo, for example, is offering a plug-in hybrid heavy-duty truck: http://www.volvotrucks.com/trucks/uk-market/en-gb/trucks/volvo-fe-hybrid/Pages/volvo-fe-hybrid.aspx.

conserving battery energy. Vehicle manufacturers are developing catenary systems, conductive charging, and inductive charging for heavy duty trucks. [47]

Catenary lines are especially useful on routes that would require a lot of power and potentially drain a battery, such as very hilly routes or routes where vehicles travel with extremely heavy loads.[48] Routes with overhead catenary systems should be viewed as an essential piece of zero-emission freight system, and development projects and future commercial projects should be focused in areas where communities are overburdened by diesel pollution from heavy-duty trucks. Some examples of high priority areas include the I-710 corridor in Long Beach, the I-880 corridor in Alameda County, and the Grapevine on Interstate 5. Communities along these corridors are exposed to high levels of carcinogenic diesel particulates. In addition, the freight hubs near these high volume goods movement corridors are likely to be at the forefront of adopting new technologies, such as battery electric heavy-duty trucks. Early-generation battery electric heavy-duty trucks will benefit from overhead catenary systems to extend their range.

Channeling resources toward greater development of these systems will provide the infrastructure necessary to support greater use of zero-emission equipment in goods movement. Furthermore, regional planning efforts to locate future warehousing and logistics facilities or other freight hubs must be coordinated with zero-emission trucks routes, including catenary roadway systems.

Although on a somewhat longer timeframe, electrification of major corridors is vital to success in the SCAG region. Much work has been completed to understand current volumes of trucks and the projected increases in trucks. The following map[49] shows the trucks volumes in 2016 compared to projections in 2045 and 2045 with SCAG's 2020 Transportation Implemented:

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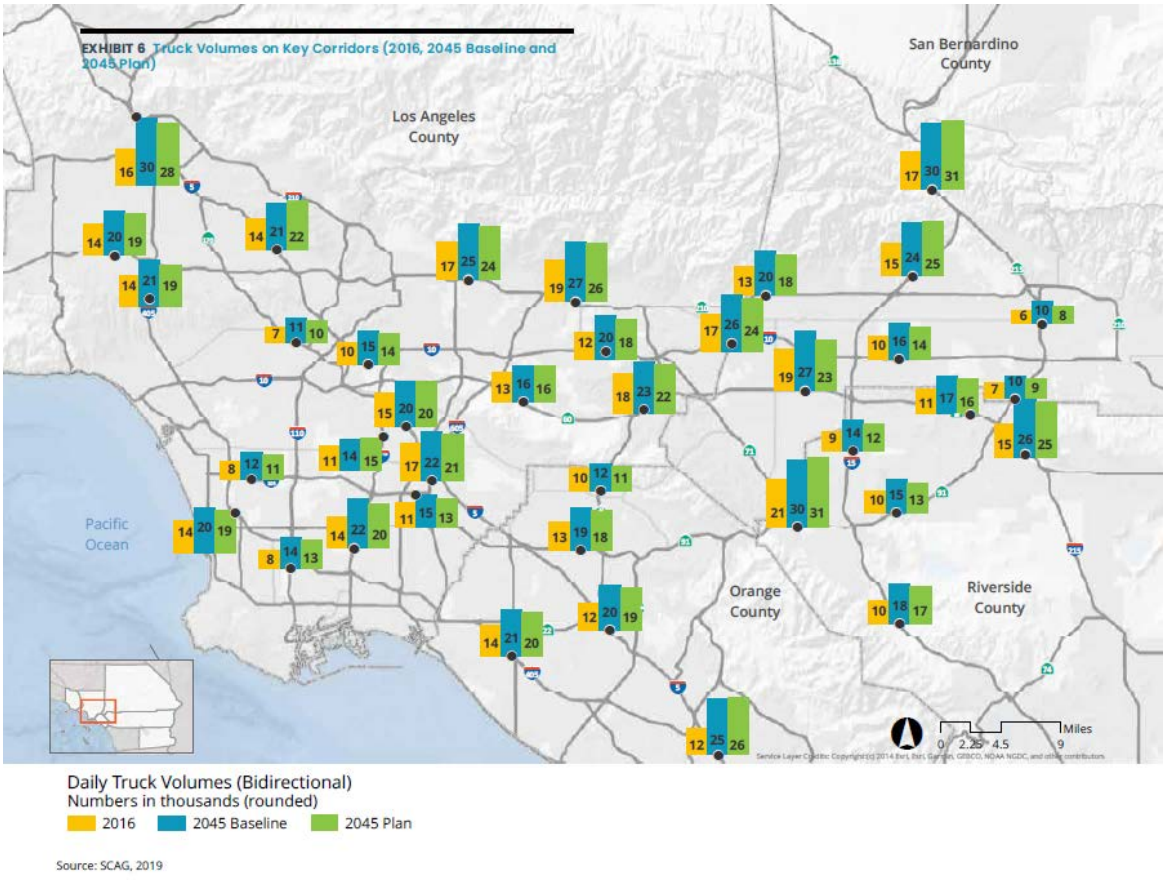
[47] Siemens, "Siemens builds first eHighway in Sweden." (June 04, 2015) (available at: http://www.siemens.com/press/en/pressrelease/?press=/en/pressrelease/2015/mobility/pr2015060246moen.htm&content[]=MO); Volvo Group, "The road of tomorrow is electric"(May 23, 2013) (available at http://news.volvogroup.com/2013/05/23/the-road-of-tomorrow-is-electric/); Fast CoExist, "Volvo Tests A Road That Can Charge Cars And Trucks" (August 2013) (available at: http://www.fastcoexist.com/3016069/futurist-forum/volvo-tests-a-road-that-can-charge-cars-and-trucks); Scania, "Scania drives development for electrified roads" (March 13, 2014) (available at: http://newsroom.scania.com/en-group/2014/03/13/scania-drives-development-for-electrified-roads/).

[48] *Id.*

[49] SCAG, Connect SoCal Technical Report, Goods Movement, at 50 (May 7, 2020).



This map makes clear that certain corridors with high levels of existing truck traffic and large projections for increased truck traffic by 2045 are prime for electrification. For example, the I-710 corridor, which is currently slated for major expansion, provides an excellent opportunity for Southern California Edison, in particular, to facilitate zero emission miles either through a catenary system or other technology. The expansive scope of this project means planning and significant coordination needs to happen now. Down the road, projects such as electrification of State Route 60 – one of the major east west corridors connecting the Ports of Los Angeles and Long Beach to large warehousing – provides another vital opportunity for freight electrification. The IEPR should identify strategies and approaches to facilitate the difficult work of electrify the major trucking corridors. The transportation agencies in California are generally failing communities in this respect, and the expertise of our energy agencies, including planning documents like the *2020 IEPR Update* will be critical in making zero-emission corridors a reality.

2. **Transit System Electrification.**

While not directly related to freight, advanced technologies in the bus market are paving the way for greater use of heavy-duty electrification technologies in the freight sector, providing

experience with infrastructure requirements, utility level grid impacts, and electricity pricing.[50] Public transit is also a critical part of the solution to the State's energy and climate challenges. Transit systems reduce oil and energy consumption, roadway congestion, and polluting emissions, resulting in benefits for riders and non-riders alike. To fully realize these benefits, and to meet SB 350's air quality and climate goals, California must transition its public transit systems to zero emission technologies.[51] Ensuring the IEPR incorporates conversion of California's entire transit bus fleet to zero-emissions consistent with California's Innovative Clean Transit Rule is necessary.

3. **Support Equipment.**

Support equipment includes the equipment that moves cargo at ports, distribution centers, and airports. Some examples are forklifts, gantry cranes, and yard hostlers. Many types of support equipment are prime candidates for electrification because they make repetitive short trips during the work day, are centrally fueled, and have time to recharge.

Cargo Handling Equipment. Zero-emissions technology is viable for many types of cargo handling equipment, but use of these technologies remains limited.[52] Electric gantry cranes, for example, have been available commercially for years but are not widely used at California ports.[53] Use of existing zero-emission forklifts and gantry cranes at ports, warehouses, and distribution centers throughout the state must be a near-term priority for building out a clean freight system.

Ground support equipment. Ground support equipment is the equipment used to move cargo at airports, such as tugs, tractors, container loaders, and buses. Zero-emission ground support equipment is commercially available for baggage tugs, tow tractors, lavatory service trucks, water trucks, and belt loaders.[54] Electric ground-support equipment is manufactured by a number of different companies including TLD, Tug Technologies Corporation, Charlatte America, Tronair, and Eagle Tugs.[55] Zero-emission ground support equipment provides an

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[50] *See* California Hybrid, Efficient and Advanced Truck Research Center (CalHEAT). "DRAFT CalHEAT Research and Market Transformation Roadmap for Medium- and Heavy-duty Trucks" at 63-64 (February 2013) ("CalHEAT Roadmap") (available at: http://www.calstart.org/Libraries/CalHEAT_2013_Documents_Presentations/CalHEAT_Roadmap_Final_Draft_Rev_7.sflb.ashx).

[51] *Id.* at 6 ("Near-zero technologies are an important part of the overall strategy for heavy-duty trucks and buses; however, a transition to zero emission technologies in transit bus applications will be necessary to meet air quality and climate goals.").

[52] California Air Resources Board, "Vision for Clean Air: A framework for Air Quality and Climate Planning" at Appendix A, 25-26 (DRAFT June 27, 2012) ("Vision for Clean Air")

[53] *Id.* at Appendix A, 25 (The status of battery-electric gantry cranes is listed as "demonstration under discussion."); "ARB Tech. Assessment," at 10 ("Electric cable reel or bus bar [rubber tired gantry cranes] and rail mounted gantry cranes (RMG) are a mature technology used at the automated foreign ports with the first delivered in 2002.")

[54] "ARB Tech. Assessment," at 9-10; Charlatte America, Products (available at: http://www.charlatteamerica.com/products).

[55] "ARB Tech. Assessment," at 10.

opportunity to reduce the severe air quality and environmental health impacts of airports on nearby communities and advance the development of zero-emission technologies more broadly. The *2020 IEPR Update* should incorporate the assumptions of California's zero emission cargo equipment rule, in addition to commitments by the Ports of Long Beach and Los Angeles.

4. **Ocean-going Vessels.**

Zero-emission technologies for ocean-going vessels are still under development. In the near-term, however, vessels can reduce emissions while in harbor by using shore-side power. While docked, ships can use shore-side electricity to power support equipment on board, such as lighting, cooling, and ventilation.[56] Shore-side power is commercially available from various manufacturers, and the Air Resources Board has already adopted regulations requiring its use in some settings.[57] In addition, this year the rule will expanded to cover more types of vessels. The Middle Harbor terminal at the Port of Long Beach is already incorporating shore-side technology as part of its redevelopment plans, demonstrating the availability of this technology.[58] Like overhead catenary systems, shore-side power can provide emission reductions that benefit overburdened communities adjacent to ports and should be fully incorporated into the IEPR projections.

5. **Locomotives.**

Zero-emission technologies for locomotives lag behind trucks and support equipment, but there are technologies that can reduce emissions from locomotives in the near-term. The near-term focus should be on increasing the amount of zero-emission miles locomotives travel. This can be accomplished using catenary systems, hybrid diesel-electric locomotives, and battery tender cars.[59] Catenary systems, as with trucks, involve using overhead wires to connect the train to electricity. Hybrid diesel-electric locomotives rely on batteries that store energy released during braking and reuse it when more power is needed. Battery tender cars are similar to the hybrid diesel-electric technology, but a battery tender car is an entire rail car devoted to batteries. Those batteries can power the locomotive without any power from diesel fuel for a short range. Battery tender cars would be a way to increase the amount of zero-emission miles traveled

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[56] *Id.* at 15.
[57] *Id.*
[58] Port of Long Beach. "Middle Harbor," (available at: http://www.polb.com/about/projects/middleharbor.asp); Port of Long Beach. "Middle Harbor Redevelopment Project," (available at: http://www.middleharbor.com/).
[59] *See* Gladstein, Neandross and Associates on behalf of the California Cleaner Freight Coalition. "Moving California Forward: Zero and Low-Emission Goods Movement Pathways," at 33-36 (November 2013) (hereinafter "Moving California Forward"); Frank Stodolsk, Argonne National Laboratory, "Railroad and Locomotive Technology Roadmap," at 45-48 (December 2002) (available at: http://www.ga.com/websites/ga/docs/transportation/ecco/Railroad%20and%20Locomotive%20Technology%20Roadmap.pdf); BNSF Railway, "Green Technology"(available at http://www.bnsf.com/communities/bnsf-and-the-environment/green-technology/); California Air Resources Board, "Freight Locomotive Advanced Technology Assessment" at 26-50 (September 3, 2014) (available at http://www.arb.ca.gov/msprog/tech/presentation/rail.pdf); "ARB Tech. Assessment," at 13 and 28.

through highly polluted areas.[60] Rail electrification has been considered in several regions, including the Bay Area and in the 2020 SCAG Transportation Plan.[61] The *2020 IEPR Update* should incorporate significant rail yard and potentially rail line electrification in its projections.

6. Transportation Refrigeration Units

Transportation Refrigeration Units (TRUs) are refrigeration systems powered by combustion engines that congregate at certain freight and distribution facilities, where they contribute to high health risk in nearby communities. CARB is developing regulations to enable a transition of TRU fleets to zero-emissions (beginning with 15 percent of purchases per year) and also requiring ZE operation when TRUs are parked or stationary. The *2020 IEPR Update* should incorporate the significant electrification of refrigerated units due to California's forthcoming regulation, in addition to the South Coast Air Quality Management District's Indirect Source Rule for Warehouses.

7. Commercial Harbor Craft

The Commission should analyze infrastructure needs for the electrification of the full range of vessel types considered as commercial harbor craft (e.g. tug vessels, ferries, pilot vessels, barges, dredges, and commercial fishing vessels). CARB has proposed a rule that expands the types of vessels covered under commercial harbor craft regulation and also strengthens the in-use and new build requirements. These vessels pose significant cancer risk and local pollution—in the San Pedro Bay Ports, harbor craft was found to be the third-highest contributor to near-source cancer risk.[62] CARB's proposed regulation to accelerate deployment of zero-emission technologies in the marine harbor craft sector is the most promising path to eliminating this cancer-risk, and this Commission should ensure that infrastructure planning does not remain a barrier to the most aggressive electrification course feasible. Therefore, the *2020 IEPR Update* must incorporate commercial harbor craft into its transportation electrification analysis to enable a shift to zero-emissions, and identify optimal pathways for infrastructure upgrades and installations to serve multiple objectives at ports and harbors.

8. Integrated Projects.

The Commission should also consider projects that span several types of equipment and clean energy generation. For example, at the Port of Los Angeles' May 19, 2016 Harbor Commission meeting it considered a lease renewal at the Pasha terminal. As part of that renewal, the Port obtained funding from Air Resources Board to demonstrate four electric yard tractors, two electric (Class 8) on-road trucks, two electric high-tonnage forklift retrofits, one electric top

[60] "Moving California Forward," at 34.
[61] For example, the Bay Area's Metropolitan Transportation Commission is exploring the feasibility of pilot projects testing lower-emission rail technologies. *See* Cambridge Systematics. "Freight Emissions Reduction Plan: DRAFT Rail Technology and Application Assessment" (March 11, 2015); SCAG, Connect SoCal Technical Report, Goods Movement, at 128-30 (May 7, 2020).
[62] CARB, Proposed Concepts for Commercial Harbor Craft in California, (Feb. 27, 2020) at 1 https://ww2.arb.ca.gov/sites/default/files/2020-03/chcwebinar03052020.pdf

handler retrofit and an at-berth vessel emission control system.[63] The Project couples these equipment components with construction of a solar powered microgrid, which will be supported by 2.6-megawatts of backup battery storage "intended to provide critical power to the charging units for the plug-in electric equipment as well as terminal system during a grid power outage."[64] These integrated projects with combined clean power generation and storage are very attractive. Moreover, the Commission should look to encourage projects at facilities that are "magnets" for diesel equipment. A prime example includes warehouses. With the proliferation of warehouses in the Inland Empire region of Los Angeles, there is immense opportunity to facilitate the imminent need for electrification of the vehicles combined with renewable power generation and storage. This is another type of project the Commission should incorporate into the *2020 IEPR Update* to make the increased energy generation needed by the transportation sector being accommodated by clean energy.

C. Role of Energy Agencies in Supporting Electrification of Freight.

California's energy agencies have a significant role to play in the policies and investments that will be fundamental in determining both the speed and effectiveness of policy efforts toward electrification of the freight sector.[65] To accelerate freight electrification, utilities and regulators must pursue innovative strategies to maximize the benefits of freight electrification to the grid and all utility customers while reducing cost barriers for businesses.

The barriers to electrification of freight vehicles and equipment fall into the same broad categories that have been identified for passenger electric vehicles and can be generally divided under three headings: (1) cost; (2) consumer awareness; and (3) supporting infrastructure. The following discussion offers recommendations for ways the Commission can take action to help address each of these.

1. Do Not Solely Focus on Hard-to-Electrify Applications to Electrify. Rather, Signal the Need for More Aggressive Action in High-Suitability Segments.

At the May 28 workshop, industry representatives devoted much of their presentations to emphasizing the barriers and hurdles they face to complete electrification of their operations. We submit that this has been a pattern of planning and rulemaking efforts on transportation electrification—where agency staff and stakeholders wind up giving inordinate time, effort, and deference to discussions of edge-case applications and worst-case charging installation scenarios that make electrification challenging or in some cases simply add costs.

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[63] Port of Los Angeles "May 19, 2016 Agenda," Item No. 9 (available at: https://www.portoflosangeles.org/Board/2016/May%202016/051916_Agenda_Item_9.pdf).
[64] *Id.*
[65] CALSTART, "Electric Truck and Bus Grid Integration: Opportunities, Challenges, and Recommendations," at 19 (Sept. 2015) (available at: http://www.calstart.org/Libraries/Publications/Electric_Truck_Bus_Grid_Integration_Opportunities_Challenges_Recommendations.sflb.ashx).

We object to this framing for two reasons. As an initial matter, this framing is unjust—it seems to admit that placating potential logistical or business-case burdens on industry is a precondition to addressing the urgent need to deliver safe and breathable air to California's most disadvantaged communities. Waiting to act only when every last objection from freight industry operators has been addressed is tantamount to asking California's low-income, majority Black and Brown communities on the frontlines of freight to continue subsidizing the cost of the status quo goods movement system. Secondly, this framing belies the fact that several segments and applications are primed for a much more rapid transition to zero-emission technology, and doing so is in many instances a significant economic opportunity. As explained below, in several applications, full or partial fleet electrification is already cost-effective, and the barriers are more to do with lack of consumer awareness, and lack of clarity for fleet operators seeking to initiate robust infrastructure planning.

Therefore, we recommend the CEC focus—in the *2020 IEPR Update* and in future workshops—on opportunities for maximizing near-term progress and learning-by-doing through accelerated deployment. For instance, developing a roadmap for freight electrification infrastructure deployment will allow other agencies to align prioritization of regulatory proceedings, incentive funding, and utility investment plans. The *2020 IEPR Update* can advise the tranches of investment that agencies should coordinate around—depot charging and electrification at logistics hubs in the immediate term; high-powered public charging stations along major urban "nodes" in the near term, and public charging stations plus dynamic charging (i.e. electric road systems) along freight corridors for long-haul trucking in the longer term.[66]

2. Actions to Address Cost Barriers

As discussed above, the viability of electrification varies across equipment and vehicle types and operational parameters. Some technologies are already commercially available and others are in earlier stages of demonstration. For all of these equipment and vehicles, the primary barrier is not technological feasibility, but cost. These cost barriers can be further broken down into upfront capital costs and operation and maintenance (O&M) costs.

The solutions to the high upfront capital costs for many types of zero-emitting freight equipment and transit vehicles will come with more research and development of battery technology[67] as well as through improvements in manufacturing efficiencies that come with the development of better supply chains and economies of scale. As noted above, targeting investments in projects that will support the electrification of vehicles and equipment with limited ranges such as transit buses, cargo handling equipment, ground support equipment, drayage trucks, and last-mile delivery trucks will enable the development that is necessary to bring down capital costs for other vehicles types.[68] Using investments to target facilities that

[66] Transport&Environment, Recharge EU Trucks: Time to Act (Feb 2020) https://www.transportenvironment.org/sites/te/files/publications/2020_02_RechargeEU_trucks_paper.pdf

[67] Experts expect battery life to improve over the next ten to twenty years, with energy densities that are anywhere from 3 times to 10 times greater than current battery energy density. *See* CE Delft Report, at 22.

[68] *See, e.g.*, CE Delft Report, at 101.

house or will attract multiple pieces of equipment or vehicles rather than individual demonstration projects also "allows for concrete examples of cost savings and economic benefits when actually switching to electrified technologies . . . ."[69]

Even without significant changes in upfront capital costs, certain types of commercially available battery electric equipment such as transit buses should already be cost competitive because higher upfront capital costs should be offset by lower O&M costs. Maintenance of electric vehicles is substantially less expensive than conventional technologies, and, in theory, "fuel" operating costs should also be lower. Several studies, however, have found demand charges and time-of-use rate structures negatively skew these operational costs.[70]

The 2015 Draft ZEV Action Plan recommends that the Commission "[d]evelop electricity tariffs for public transit fleets and the freight sector that encourage electrification, promote efficient utilization of grid resources and allow for recovery of utility capital costs."[71] CALSTART's review recommended designing rate structures that: acknowledge the unique needs of the electric truck and bus market; recognize the environmental and grid benefits of electrification in the heavy-duty sector; separately submeter such charging where it makes sense; and are compatible with fleet operations.[72]

Demand charges in particular have been identified as a potentially significant barrier to investments in electrification.[73] The 2015 Draft ZEV Action Plan again recommends that regulators "[c]onsider revising demand charges to encourage zero-emission vehicle use in the heavy duty vehicle sector" and "[c]onsider expanding [the] three year demand charge waiver for plug-in electric buses to a minimum of 12 years."[74]

Demand charges could also be mitigated by encouraging investments in infrastructure such as smart chargers, storage, energy efficiency and on-site renewables to alleviate peak demand. CALSTART concluded that:

> Smart charging systems can enable better grid integration by balancing EV charging and building load to charge the greatest number of vehicles at the lowest cost possible and increase certainty of service for the fleets. In addition to reducing demand charges, smart charging E-Trucks & Buses can also minimize the impact of TOU and reduce charging infrastructure costs. But to achieve the latter benefit, smart charging strategies need to be

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[69] ICF. "California Transportation Electrification Assessment – Phase 3-Part A: Commercial and Non-Road Grid Impacts – Final Report," at 48 (Jan. 2016) (available at: http://www.caletc.com/wp-content/uploads/2016/01/California-Transportation-Electrification-Assessment-Phase-3-Part-A.pdf).
[70] *See, e.g., id.* at 47 ("Utility rate structures are one of several key decision factors for potential [transportation electrification] consumers, and can represent the difference between a consumer accruing a return on their investment or realizing a net loss.").
[71] 2015 Draft ZEV Action Plan, at 20.
[72] CALSTART. "Electric Truck and Bus Grid Integration: Opportunities, Challenges, and Recommendations," at 26.
[73] CALSTART. "Electric Truck and Bus Grid Integration: Opportunities, Challenges, and Recommendations," at 16.
[74] 2015 Draft ZEV Action Plan, at 18, 21.

taken into account when calculating the load added by E-Truck & Bus charging. One fleet detailed a particular case where utility code mandated that a facility electric infrastructure be upgraded to accommodate all the E-Trucks charging at the same time at the maximum charging rate even if charging could easily be managed to reduce the peak facility load.[75]

Energy storage systems can also be used to smooth out peak loads. ICF noted that "there may be a way to monetize the value of the secondary life of batteries and pass those benefits on to consumers at the point of purchase" and suggested that the Commission could extend to other vehicle sectors its approval of "PG&E's request to implement a Plug-In Electric Vehicle Pilot 32 to evaluate whether there is a sufficient business case for light-duty automobile manufacturers to provide grid services from second life batteries . . . ."[76] Second-life battery applications could be of particular interest in freight operations, which often involve larger fleets of equipment and vehicles.

The *2020 IEPR* Update should specifically signal the need to pursue infrastructure that will help alleviate the cost barriers.

3. **Actions to Address Infrastructure Barriers**

This is the barrier that has perhaps the greatest nexus to the *2020 IEPR Update*. This planning document should be used to articulate the true scope of work necessary to achieve California's ambitious goals to protect public health, meet clean air standards, and meet climate pollution reduction goals.

III. **CONCLUSION**

We appreciate your consideration of these comments, and we look forward to working together to advance transportation electrification in a way that addresses the systemic environmental injustices exposing certain communities disproportionately to deadly freight pollution.

Sincerely,

Adrian L. Martinez

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[75] *Id.* at 21.
[76] ICF. "California Transportation Electrification Assessment – Phase 3-Part A: Commercial and Non-Road Grid Impacts – Final Report," at 41 (Jan. 2016).