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Workshop on the Zero-Emission Vehicle Infrastructure Plan

Additional submitted attachment is included below.

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February 03, 2022
Commissioner McAllister
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Re: Lawrence Berkeley National Laboratory Comments on the Zero-Emission Vehicle (ZEV) Infrastructure Plan (ZIP).

Commissioner McAllister,

On Thursday, January 20, 2022, Commission staff hosted a workshop regarding the Zero-Emission Vehicle (ZEV) Infrastructure Plan (ZIP). Berkeley Lab is pleased to present our comments in response to the workshop.

In regards to the ZEV goal presented in the workshop of 100% ZEV off-road vehicles and equipment to zero-emission where feasible by 2035, Berkeley Lab comments that
Nearly all US locomotives are propelled by diesel-electric drives, which emit 35 million tons of CO_2 and produce air pollution causing about 1,000 premature deaths annually, accounting for approximately US$6.5 billion in annual health damage costs. Improved battery technology plus access to cheap renewable electricity open the possibility of battery-electric rail. At near-future battery prices, battery-electric trains can achieve parity with diesel-electric trains if environmental costs are included or if rail companies can access wholesale electricity prices and achieve 40% use of fast-charging infrastructure. Accounting for reduced criteria air pollutants and CO_2 emissions, switching to battery-electric propulsion would save the US freight rail sector US$94 billion over 20 years.

Berkeley Lab also comments that in order to support California state goals to reduce carbon and pollution emissions (AB2127), Berkeley Lab's software tool-HEVI-LOAD (LBNL is contracted by California the Energy Commission to develop this tool) is developing projections and performing an optimal assessment of the charging infrastructure needed for the electric medium- and heavy-duty vehicles (MHDV) by 2030. The MHDV projections will also consider transportation system and electric system interaction with light-duty vehicles. The project consists of 2 approaches in general: a top-down approach that takes aggregated MHDV adoptions as the inputs and provides the county-level projections of charging load profile and infrastructure need, and a bottom-up approach that incorporates more granular (temporal, spatial, and duty-cycle-specific) behaviors of a variety of MHDVs into activity simulations/optimizations for further analysis.

Regarding additional ZEV goals presented by the Energy Commission, Berkeley Lab notes that it has developed Behavior, Energy, Autonomy, Mobility (BEAM) which is an agent based computational passenger transportation model for simulating the actions and interactions of passengers i.e. individual agents in the transportation system.

Berkeley Lab recommends considering and analyzing the impact on short term traveler behavior when changes are made to the traffic system and to understand traveler behavior such as change in mode choices or routing decisions when levers on the supply side of the traffic system are modified.

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Analyzing the iterative relationship between paradigm shifts in the traffic system and its effect on long-term traveler behavior in addition to analysis such as modeling market penetration, technology evolution, consumer use, and energy implications of advanced vehicle technologies and mobility services with high temporal and spatial resolutions is important to understand impact of consumer decisions on infrastructure deployment policies and vice versa. This granularity across time and space of multiple agent-based interactions when aggregated at regional or locality level enables strategic decision making for developing policies and informing infrastructure investments in the public as well as private realm.

Berkeley Lab's BEAM CORE tool offers both policy makers and private players and service providers a robust and realistic transportation system simulation platform to assess alternative strategies for rolling out decisions in a virtual world rather than investing millions of dollars in the real world for infrastructure deployment in the context of travel behavior and equity considerations, technology evolution, and energy use for ZEVs.

Berkeley Lab appreciates the opportunity to provide these comments related to the Zero-Emission Vehicle (ZEV) Infrastructure Plan (ZIP).

Sincerely,
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