



Fiscal Year (FY) 2024-25 Research Initial Scope of Work (ISOW)

Task ID: 4490

Task Title: Weight impacts of heavy-duty ZEVS

1. What is the need? Briefly describe the problem this research will address and the reason(s) for conducting this research. Include any pertinent background information. If this request is part of a multi-task project, explain how this request relates to the project as a whole.

This research request proposes to determine the potential impacts of weights associated with heavy-duty zero-emission vehicles (ZEVs) on pavement degradation, freight operations, and roadway safety. These potential impacts are of importance to industry, the public, and transportation agencies in California.

In 2020, Governor Newsom signed Executive Order N-79-20, declaring a goal for California to reach 100 percent zero-emission medium and heavy-duty vehicles by 2045 for all operations where feasible. With such a goal, transportation agencies must anticipate and prepare to mitigate any impacts of these vehicles on road infrastructure and safety. Additionally, the recently approved Clean Freight Corridors Efficiency Report, led by the California Transportation Commission as required by Senate Bill 671, calls upon Caltrans to evaluate the impacts of heavier zero-emission trucks on the state highway system and develop solutions to address the impacts. That evaluation should include potential roadway impacts, impacts to other roadway users, and impacts to fleets.

Moreover, current commercial ZEVs are heavier than their diesel counterparts, prompting allowance of a 2,000 lbs. weight increase for ZEVs at the federal level and calls for additional allowances by some industry stakeholders. Heavier trucks degrade pavement conditions faster and increase stopping distance lengths, potentially affecting safety. Alternatively, goods movement carriers may reduce load sizes needed to accommodate the increased weights of zero-emission truck cabs to remain below weight limits and in turn reduce industry efficacy. Increased weight limits for trucks could thus lessen operational costs for the freight industry but increase the degradation of Interstate, State Highway, and Local Road systems.

The benefits of conducting this research include improved preparation by Caltrans for the transition to heavy-duty ZEVs in terms of road infrastructure, roadway safety, and freight operations. This research will help Caltrans by informing decisions and policies regarding

vehicle weights and thus improving safety and decreasing costs to Californian residents and taxpayers.

2. What is the product? Briefly describe the anticipated product of this research and how it will solve the problem.

The research will result in a comprehensive report of weight impacts of heavy-duty ZEVS on roads, operations, and safety. This includes a technical review of latest trends of ZEV weights recommendations based on original analysis that incorporates the most recent and robust inputs to quantify pavement degradation, road maintenance costs, freight duty cycles, and safety. The research will take 2 years. The desired outcome is a peer-reviewed report that includes (1) a literature review of related studies and (2) a technical review of the latest trends in ZEV weights, which are the total mass of the vehicle and its components, such as batteries, motors, and chassis.

What is the plan to implement the product following a successful research project? Briefly describe the steps the customer's division or program will take to achieve implementation.

Caltrans will use the research results (literature review, technical review, and original analysis) to decide whether to increase the weight limits. Results can be implemented either as part of a comprehensive ZEV strategy or in parts as the realities of increased zero-emission freight in California. Applicable best practice policies, programs, and technological solutions for the abatement and mitigation of identified impacts will be applied. These changes can occur over 3-5 years. At the State DOT level, Maintenance, Operations, Design, and Planning functions will benefit from this research, and each has some responsibility in implementing policies associated with ZEVs. Implementation of study findings would be funded through existing resources.

3. Related Research: *If any.*
N/A