

Plan Overview

A Data Management Plan created using DMPTool

Title: Electric Truck Fleet Management under Limited and Uncertain Charging Infrastructure Availability

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Template: National Center for Sustainable Transportation - Project Data Management Plan

Project abstract:

California has set aggressive targets and timelines for the sales and adoption of zero-emission trucks in the state. However, developing a charging infrastructure network for medium- and heavy-duty electric trucks is challenging and will take time. In addition, there has also been much debate about whether the electric grid capacity expansion can keep pace with this anticipated mass adoption of EVs. The goal of this research is to simultaneously address the issues of freight decarbonization and supply chain resiliency by designing electric truck fleet management strategies that: 1) consider the limited availability of charging infrastructure for MD/HD EVs, at least in the near future; 2) can respond to the uncertainties associated with electric grid service interruption or disruption; and 3) analyze the requirements and constraints associated with long-haul and short-haul with respect to electric trucks. This collaborative project will bring together researchers from USC who are experts in long-haul trucking operations and researchers from UCR who possess complementary expertise in short-haul trucking (e.g., drayage) operations. The requirements for long-haul and short-haul operations for electric trucks are substantially different when it comes to distance of travel, parking availability, hours of service (HOS), and infrastructure charging, among other things. We feel that it is critical to consider all of these issues as a single project, where we can explore together the different synergies and tradeoffs encountered between long-haul and short-haul operations. Further, we intend to work together to expand this towards “medium-haul” scenarios as well. It is expected that the results from this research will serve as another “tool” in our toolbox to ease the transition towards full truck electrification.

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Electric Truck Fleet Management under Limited and Uncertain Charging Infrastructure Availability

All data to be collected will be from publicly available sources regarding truck battery characteristics, truck data which involve possible routes, parking locations and parking availability data where available, truck demand for long haul. We will be using electric truck characteristics data and models, which are available publicly.

In addition, we will be using the existing dataset cited below, which is available through DRYAD.

- Peng, Dongbo; Wu, Guoyuan; Boriboonsomsin, Kanok (2023). Developing an efficient dispatching strategy to support commercial fleet electrification [Dataset]. Dryad. <https://doi.org/10.6086/D11974>.

We will do doing simulations using traffic simulators and Matlab. All simulation data will be presented in the form of tables and graphs and will be published in final report and publications.

The tables and figures with presented data will be useful to readers to understand certain aspects of truck electrification, parking and scenarios of lost power and emergencies.

No special format of the data. They will be presented in tables and figures.

The data generated will be publicly accessible as they will be published in reports and publications. There are no issues of privacy and confidentiality/

Not applicable

All data to be collected will be from publicly available sources and will be indicated in all of our deliverables. Any generated data from simulations will be presented in tables and figures and presented as part of deliverables as they are generated.

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