

Emissions impact of connected and automated vehicle deployment in California - model results Dataset

Dataset available at: <https://doi.org/10.25338/B86926>

(This dataset supports report **Emissions Impact of Connected and Automated Vehicle Deployment in California**, <https://doi.org/10.7922/G2DR2SS6>)

This U.S. Department of Transportation-funded dataset is preserved by the University of California in the digital repository Dryad (<https://datadryad.org>), and is available at <https://doi.org/10.25338/B86926>

The related final report **Emissions Impact of Connected and Automated Vehicle Deployment in California**, is available from the National Transportation Library's Digital Repository at <https://rosap.ntl.bts.gov/view/dot/59136>.

Metadata from the Dryad Repository record:

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Abstract:

This study helps understand how the anticipated emergence of autonomous vehicles will affect various aspects of society and transportation, including travel demand, vehicle miles traveled, energy consumption, and emissions of greenhouse gases and other pollutants. The study begins with a literature review on connected and automated vehicle (CAV) technology for light-duty vehicles, the factors likely to affect CAV adoption, expected impacts of CAVs, and approaches to modeling these impacts. The study then uses a set of modifications in the California Statewide Travel Demand Model (CSTDm) to simulate the following scenarios for the deployment of passenger light-duty CAVs in California by 2050: (0) Baseline (no automation); (1) Private CAV; (2) Private CAV + Pricing; (3) Private CAV + Zero emission vehicles (ZEV); (4) Shared CAV; (5) Shared CAV + Pricing; (6) Shared CAV + ZEV. The modified CSTDm is used to forecast travel demand and mode share for each scenario, and this output is used in combination with the emission factors from the Emission FACtor model (EMFAC) and Vision model to calculate energy consumption and criteria pollutant emissions. The modeling results indicate that the mode shares of public transit and in-state air travel will likely sharply decrease, while total vehicle miles traveled and emissions will likely increase, due to the relative convenience of CAVs. The study also reveals limitations in models like the CSTDm that primarily use sociodemographic factors and job/residence location as inputs for the simulation of activity

participation and tour patterns, without accounting for some of the disruptive effects of CAVs. The study results also show that total vehicle miles traveled and vehicle hours traveled could be substantially impacted by a modification in future auto travel costs. This means that the eventual implementation of pricing strategies and congestion pricing policies, together with policies that support the deployment of shared and electric CAVs, could help curb tailpipe pollutant emissions in future scenarios, though they may not be able to completely offset the increases in travel demand and road congestion that might result from CAV deployment. Such policies should be considered to counteract and mitigate some of the undesirable impacts of CAVs on society and on the environment.

Methods:

The dataset is generated as the outcome of the research project - Emissions Impact of Connected and Automated Vehicle Deployment in California.

Usage Notes:

The dataset includes model results on trips, VMT, and emissions for California.

Funding:

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Recommended citation:

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Dataset description:

This dataset contains 1 .zip file collection described below.

doi_10.25338_B86926_v6.zip:

This collection contains 82 .csv file and 1 .txt file listed below.

- 0._BAU.TREDIS_CVM_TripsbyCounty_2050.csv
- 0._BAU.TREDISExternalPersonTripsbyCounty_2050.csv
- 0._BAU.TREDISExternalVehicleTripsbyCounty_2050.csv
- 0._BAU.TREDISPersonTripsModebyCounty_2050.csv
- 0._BAU.TREDISVehicleTripsModebyCounty_2050.csv
- 0._BAU.TripModebyCounty_2050_raw.csv
- 1a._HD.TREDIS_CVM_TripsbyCounty_2050.csv
- 1a._HD.TREDISExternalPersonTripsbyCounty_2050.csv
- 1a._HD.TREDISExternalVehicleTripsbyCounty_2050.csv
- 1a._HD.TREDISPersonTripsModebyCounty_2050.csv
- 1a._HD.TREDISVehicleTripsModebyCounty_2050.csv
- 1a._HD.TripModebyCounty_2050_raw.csv
- 1b._HDUB.TREDIS_CVM_TripsbyCounty_2050.csv
- 1b._HDUB.TREDISExternalPersonTripsbyCounty_2050.csv
- 1b._HDUB.TREDISExternalVehicleTripsbyCounty_2050.csv
- 1b._HDUB.TREDISPersonTripsModebyCounty_2050.csv

- 1b._HDUB.TREDISVehicleTripsModebyCounty_2050.csv
- 1b._HDUB.TripModebyCounty_2050_raw.csv
- 2a._Pricing.TREDIS_CVM_TripsbyCounty_2050.csv
- 2a._Pricing.TREDISExternalPersonTripsbyCounty_2050.csv
- 2a._Pricing.TREDISExternalVehicleTripsbyCounty_2050.csv
- 2a._Pricing.TREDISPersonTripsModebyCounty_2050.csv
- 2a._Pricing.TREDISVehicleTripsModebyCounty_2050.csv
- 2a._Pricing.TripModebyCounty_2050_raw.csv
- 2b._PricingUB.TREDIS_CVM_TripsbyCounty_2050.csv
- 2b._PricingUB.TREDISExternalPersonTripsbyCounty_2050.csv
- 2b._PricingUB.TREDISExternalVehicleTripsbyCounty_2050.csv
- 2b._PricingUB.TREDISPersonTripsModebyCounty_2050.csv
- 2b._PricingUB.TREDISVehicleTripsModebyCounty_2050.csv
- 2b._PricingUB.TripModebyCounty_2050_raw.csv
- 4a._Sharing.TREDIS_CVM_TripsbyCounty_2050.csv
- 4a._Sharing.TREDISExternalPersonTripsbyCounty_2050.csv
- 4a._Sharing.TREDISExternalVehicleTripsbyCounty_2050.csv
- 4a._Sharing.TREDISPersonTripsModebyCounty_2050.csv
- 4a._Sharing.TREDISVehicleTripsModebyCounty_2050.csv
- 4a._Sharing.TripModebyCounty_2050_raw.csv
- 4b._SharingUB.TREDIS_CVM_TripsbyCounty_2050.csv
- 4b._SharingUB.TREDISExternalPersonTripsbyCounty_2050.csv
- 4b._SharingUB.TREDISExternalVehicleTripsbyCounty_2050.csv
- 4b._SharingUB.TREDISPersonTripsModebyCounty_2050.csv
- 4b._SharingUB.TREDISVehicleTripsModebyCounty_2050.csv
- 4b._SharingUB.TripModebyCounty_2050_raw.csv
- 5a._SharingPricing.TREDIS_CVM_TripsbyCounty_2050.csv
- 5a._SharingPricing.TREDISExternalPersonTripsbyCounty_2050.csv
- 5a._SharingPricing.TREDISExternalVehicleTripsbyCounty_2050.csv
- 5a._SharingPricing.TREDISPersonTripsModebyCounty_2050.csv
- 5a._SharingPricing.TREDISVehicleTripsModebyCounty_2050.csv
- 5a._SharingPricing.TripModebyCounty_2050_raw.csv
- 5b._SharingPricingUB.TREDIS_CVM_TripsbyCounty_2050.csv
- 5b._SharingPricingUB.TREDISExternalPersonTripsbyCounty_2050.csv
- 5b._SharingPricingUB.TREDISExternalVehicleTripsbyCounty_2050.csv
- 5b._SharingPricingUB.TREDISPersonTripsModebyCounty_2050.csv
- 5b._SharingPricingUB.TREDISVehicleTripsModebyCounty_2050.csv
- 5b._SharingPricingUB.TripModebyCounty_2050_raw.csv
- countycode.xlsx
- EM_ALL.csv
- Em_VMT_0.csv
- Em_VMT_1a.csv
- Em_VMT_1b.csv
- Em_VMT_2a.csv

- Em_VMT_2b.csv
- Em_VMT_3a.csv
- Em_VMT_3b.csv
- Em_VMT_4a.csv
- Em_VMT_4b.csv
- Em_VMT_5a.csv
- Em_VMT_5b.csv
- Em_VMT_6a.csv
- Em_VMT_6b.csv
- VMT_0.csv
- VMT_1a.csv
- VMT_1b.csv
- VMT_2a.csv
- VMT_2b.csv
- VMT_3a.csv
- VMT_3b.csv
- VMT_4a.csv
- VMT_4b.csv
- VMT_5a.csv
- VMT_5b.csv
- VMT_6a.csv
- VMT_6b.csv
- README.txt

The .csv, Comma Separated Value, file is a simple format that is designed for a database table and supported by many applications. The .csv file is often used for moving tabular data between two different computer programs, due to its open format. The most common software used to open .csv files are Microsoft Excel and RecordEditor, (for more information on .csv files and software, please visit <https://www.file-extensions.org/csv-file-extension>).

The .txt file type is a common text file, which can be opened with a basic text editor. The most common software used to open .txt files are Microsoft Windows Notepad, Sublime Text, Atom, and TextEdit (for more information on .txt files and software, please visit <https://www.file-extensions.org/txt-file-extension>).

National Transportation Library (NTL) Curation Note:

As this dataset is preserved in a repository outside U.S. DOT control, as allowed by the U.S. DOT's Public Access Plan (<https://ntl.bts.gov/public-access>) Section 7.4.2 Data, the NTL staff has performed NO additional curation actions on this dataset. NTL staff last accessed this dataset at <https://doi.org/10.25338/B86926> on 2022-01-14. If, in the future, you have trouble accessing this dataset at the host repository, please email NTLDataCurator@dot.gov describing your problem. NTL staff will do its best to assist you at that time.