

Demand Analysis Working Group 2019 Revised Transportation Forecast

Approach to Estimate Vehicle Emissions



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California Energy Commission



Why Calculate Vehicle Emissions?



CALIFORNIA
ENERGY COMMISSION



California Energy Commission
COMMISSION REPORT

**Draft 2019 Integrated
Energy Policy Report**

Gavin Newsom, Governor
November 2019 | CEC-100-2019-001-CMD

Ch.8: Transportation Energy Demand Forecast Recommendation

Leverage the transportation energy demand forecasting models to assess zero-emission transportation policies



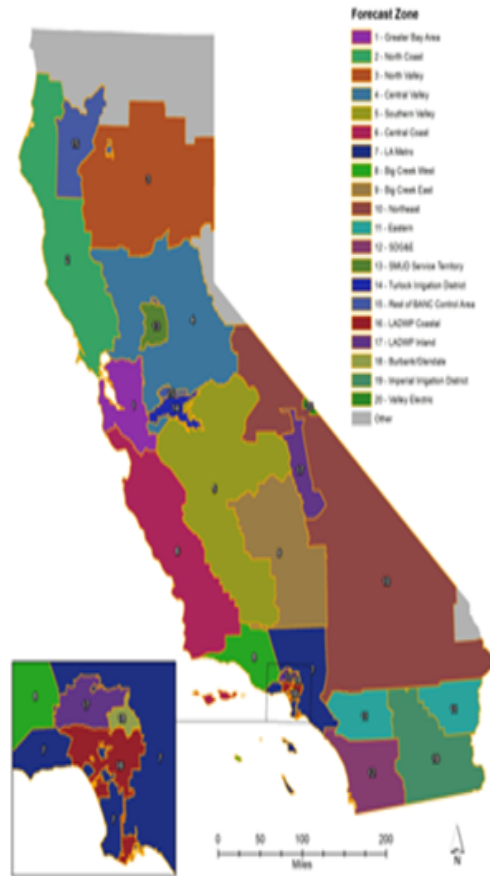
Exploratory Questions

- What are the estimated NO_x and GHG emissions in 2023, 2024, and 2030?
 - Statewide and locally
- How do changes in fleet compositions impact estimates?
- What are preliminary results/conclusions?
- What is missing or would be of interest?



Geographic Misalignments

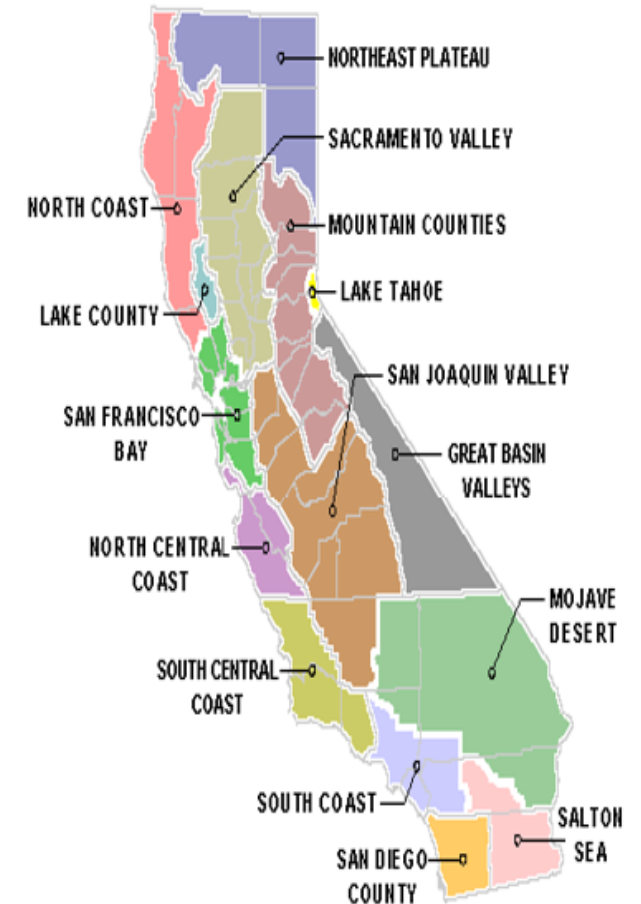
Energy Commission Forecast Zones



California Air Districts



California Air Basins





What Data Sources?



- Revised mid case vehicle forecast
 - Vehicle stock in selected years
 - Vehicle Miles Traveled
 - Travel Characterizations (number of trips)
- EMFAC 2017 Web Database
 - Emission rate factors by vehicle category, model year, and fuel type
 - Some vehicle data (compare/contrast)



How to Estimate?

$$\begin{aligned} \text{Annual Emissions} = \\ = & \text{Stock} * ((\text{RUNEX} * \text{VMT}) + (\text{STREX} * \text{Trip}) \\ & + (\text{IDLEX} * \text{IdleHours})) \end{aligned}$$

Where:

Stock = vehicle class population in calendar year

RUNEX = running exhaust per VMT

VMT = Annual Vehicle Mile Traveled

STREX = Start Exhaust per trip

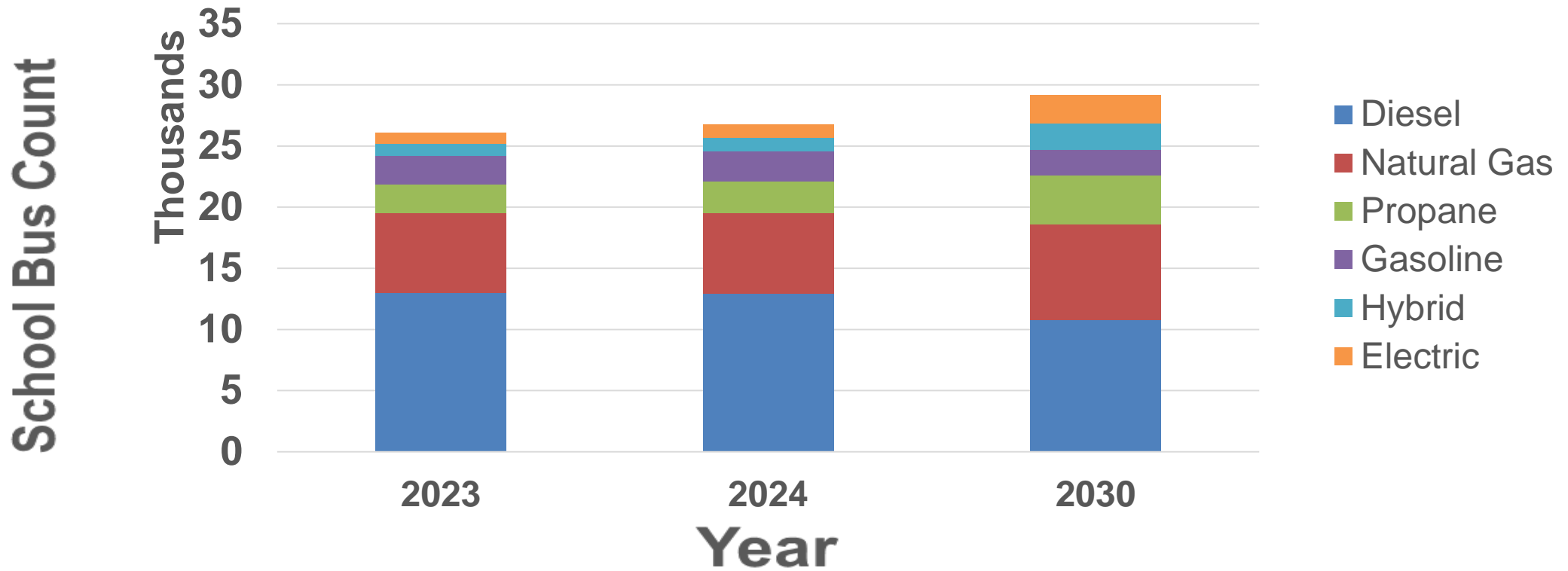
Trip = annually aggregated number of the starts and idles

IDLEX = emissions during extended idling events by HD trucks

IdleHours = annual hours of extended idling by HD trucks



Revised School Bus Forecast by Fuel Type



Source: from CEC Revised Transportation Energy Demand Forecast (2019-2030)



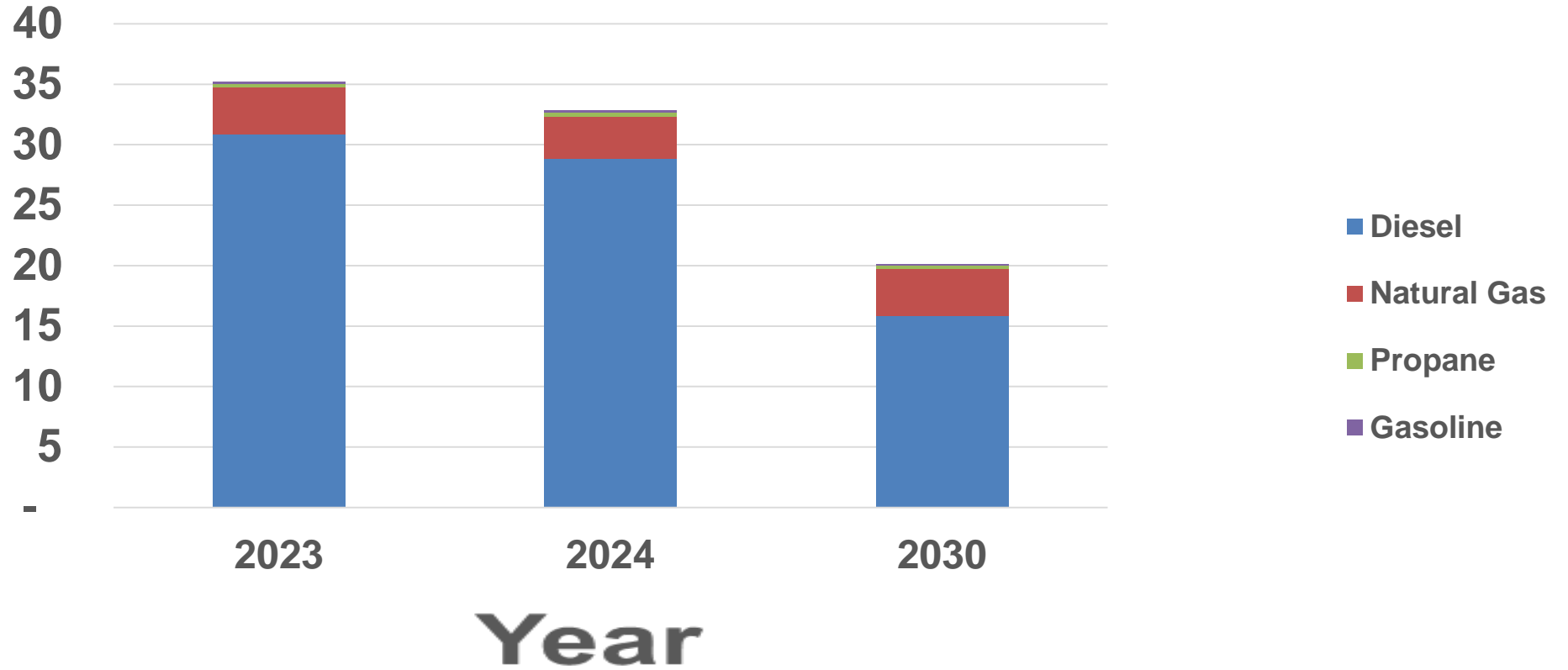
Estimating School Bus Emissions in Selected Years

- Applied the school bus stock, as determined by the revised mid case forecast
 - 29 thousand school buses in 2030
 - Roughly 3 thousand ZEV school buses in 2030 (10% of Total)
- Assumed 16,300 annual VMT (100 miles per school bus operated 163 days per year)
- Assumed roughly 5 million trips
 - 25 miles per hour average driving speed, 5 stops per mile
- No idling emissions



Preliminary Results – School Bus NOx Emissions

NOx Emissions in Tons





Questions? Contact Info:

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