

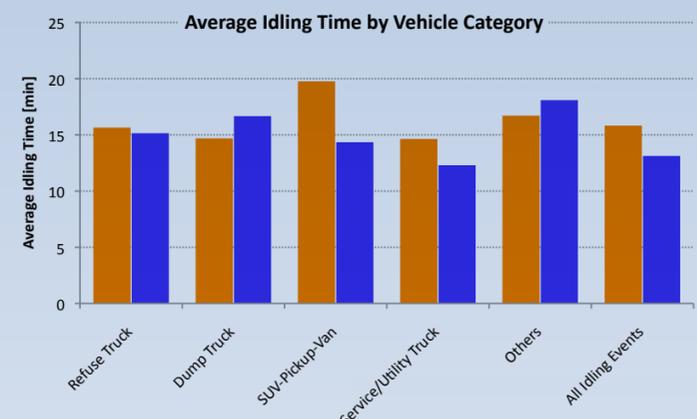
Abstract

Vehicle idling in the United States wastes approximately 6 billion gallons of fuel annually, with concomitant emissions of CO₂ and other pollutants. Due to the large amount of vehicle traffic in urban areas, even small reductions in idling can yield large fuel and monetary savings. In 2006 a large, northern city implemented a five-minute idling policy for city vehicles, whether gasoline-powered or diesel; in 2010, it enacted a law to limit the idling of all diesel vehicles to three minutes. Emergency vehicles are exempt, as are sleeper cabs in extreme hot or cold weather. This study explores the benefits that have been achieved by the policy and the new law.

Methodology

To characterize idling behavior in the City, we obtained data from GPS systems installed in city-owned and operated vehicles to approximate the amount of time spent idling, based on recorded information such as speed, vehicle location, and posting time. We assumed that engine-on records showing speed=0 and no change in vehicle location were instances of idling. Events under three minutes were not recorded, since they are permitted, and events over 60 minutes were separated out to be examined separately. We also observed stopped vehicles within the City to gauge levels of compliance for private vehicles, and determined which vehicle types idled most frequently and which locations were 'hotspots' for idling occurrences.

Results



Above: Results show that except for two categories (dump trucks and others), idle time did drop between December 2005, before both the City's five-minute idle policy, and its three-minute diesel vehicle idle law, and December 2010, when both were in place.



Above: Overall, the frequency of extended (>40 minutes) idling events is small; most idling events in 2010 were between three and six minutes long.



Measurements and Observations

The City's vehicle fleet comprises approximately 2000 GPS-equipped vehicles. Many of these GPS-equipped vehicles are also equipped with idle-shutdown units set to cut off the engine after five minutes. We aggregated data into several vehicle types: refuse trucks, dump trucks, pick-up trucks and vans, service and utility trucks, and others, representing both diesel and gasoline fuel consumption. We examined cold-weather data for December 2005, before both the policy and the law were implemented, and December 2010, after both were in place. Many more vehicles had been GPS-equipped between analysis periods, so per-vehicle idling (rather than total identified) in each class was compared to see if idling had been reduced during that time. Fuel use and emission reductions will be estimated in the future.

We observed vehicles in the City on several occasions, mainly shuttle buses and tour buses. On days both above 80°F, when the ordinance provides an exemption, and below 80°F, when the ordinance applies, we observed various double-decker tour buses, trolleys, shuttles, and coach buses idling for periods ranging from more than one minute to over one hour, sometimes with no passengers or customers on the bus in need of air conditioning.

GPS Data

- Location
- Engine status
- Speed
- Odometer readings
- Time and duration of observed event

Observation

- Time of day
- Weather conditions
- Location
- Number of vehicles idling vs. not idling
- Vehicle occupancy
- Conversations with drivers
- Significant driver actions

Observations

- Preliminary observations show that although the law has encouraged idle reduction in city vehicles, some classes of private vehicles are still idling significantly.
- Among vehicles observed not idling were several belonging to express delivery companies with strict energy-conservation policies, and one belonging to a TV station. That van had an auxiliary generator supplying power to its equipment.
- Although taxi cabs are not diesel vehicles, they still represent a significant percentage of the vehicle traffic in the City, and they do contribute to unnecessary pollution and fuel waste. Based on the number of instances in which taxis were observed idling unnecessarily, it might be beneficial to reach out to classes of vehicles that do not fall within the City's restrictions, since their idling is still wasteful.



Conclusions

- On average, idling of City vehicles has decreased since the policy and law went into effect.
- Some idling measured using odometer readings and addresses may not be sufficiently accurate, as in the case of garbage trucks, since the odometer measures movement in 1/10-mile increments, and most garbage trucks travel less than that between stops. X-Y coordinates will be compared as a check on these events.
- Some idling may be necessary, such as for power take-off. More detailed information about use patterns and duty cycles for the City vehicles would enhance the determination of necessary vs. unnecessary idling.
- Further action by various stakeholders may aid the City in fully achieving the intended benefit of the law.

