

## The Dirty Tail of Vehicle Fleets and how to Detect and Clean the High Emitters - the Fastest Route to Clean Urban Air at Low Cost

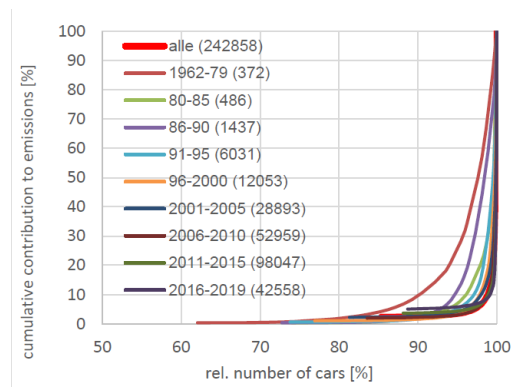
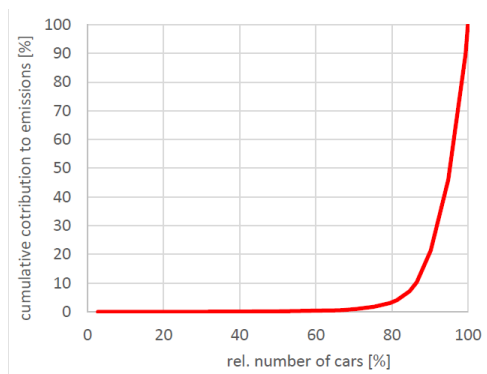
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Homologation, Conformity of Production COP, In Service Conformity (ISC) and Surveillance Monitoring take care of systematic deteriorating effects of emissions given by the applied technology and established production quality.

But, what about wear, random failures, maintenance negligence and intentional manipulation, which might have much stronger influence on urban air quality than built-in and well controlled systematic deteriorations? Recent vehicle emission history has clearly demonstrated that these statistics and manipulative effects can increase emission levels by several orders of magnitude above limit values and are not necessarily detected by most modern on-board control since even OBD seems to be an easy target for manipulation.



PN at idle of 1000 Diesel vehicles in Zürich with DPF

PN at light load of 400'000 petrol vehicles in the city of Mexico

This risk of deterioration has become larger with introduction of emission control elements like DPF, DOC and SCR since these technologies are expensive to replace, temptation for manipulation is increasing. These statistics tell us, that a few cars, maybe 2-3% of the fleet – overaged, damaged, deteriorated or manipulated, dominate the pollution of urban air. Repairing or scrapping them could reduce PN pollution and also other toxic air contaminants immediately and by a very high degree as well as at low cost. But we need to identify them – and this requires frequent full fleet periodic technical inspection (NPTI).

Why choose PN as the flagship metric for air pollution?

- because it dominates the health risk in urban air;
- because it is the most sensitive criterion, easy to control, monitor and quantify;
- because it characterizes the main contributor of the internal combustion engine best;

This new testing method will be described as well as the instruments which have been developed by the international VERT-NPTI working group during 2016-19 and now implemented in four European countries for testing of DPF-equipped Diesel vehicles. The target, however, is, to use this tool for all vehicles and also to find out which technical measures can be recommended to mitigate the high emitters. Preliminary results from a NPTI testing campaign of 1000 gasoline within the Horizon Europe AeroSolfd project are also presented.