Strengthening Inspection & Maintenance System in India

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Background

A steep growth of vehicles is projected in the future and it is estimated that the on-road vehicular population in India would be 319 million by 2030.The emissions are expected to grow if not controlled in time. The best option to control emissions would be to reduce the number of vehicles on road. However, considering business as usual the Government of India has recently announced the introduction of BS-VI emission norms for control of emissions from new vehicles from 2018. Even with the tightening of the emission norms and introduction of cleaner fuel in the past, the expected results have not been observed in the air quality of Indian cities. In the absence of an effective inspection and maintenance system, the on road reduction in emissions cannot be ensured even with the introduction of cleaner fuels.

Limitations of I&M System in India

•Some of the testing parameters like Hartridge Smoke Unit (HSU) are quite dated and need to be changed.
•The idle speed testing mode and FAS are not the best testing modes for inspection of in-use vehicles.
•OBD can be a game changer for inspection and maintenance of in-use vehicles in India; however, it is still not a part of the formal PUC system. At present, there are no standards and guidelines for reading the codes generated by OBD.
•Despite a provision of heavy penalties, merely 21% of vehicles in 2014 appeared for PUC testing in Delhi.
•Those vehicles which appear for testing also do not ensure compliance to the prescribed norm due to issues of manual interference, tampering, and manipulation with the datasets.
•The PUC data analysis suggests that less than 1% diesel vehicles were found to fail in the two cities.
•In the case of gasoline/CNG/LPG vehicles, the failure rates varied from 1%–5% for different categories of vehicles. Failure rates were higher in Mysore as compared to Bengaluru, possibly due to poor maintenance of vehicles or better enforcement of I&M testing laws.

Recommendations

•The vehicles which do not have OBDs installed should be tested at the existing PUC facilities. However, the technology at the existing stations should be improved with new technologies like LLSP (for PM) and NDUV (for NOx).
•OBD systems should be made mandatory for all vehicles by 2020. The standards to assess the OBD datasets for desired performance of the vehicles need to be developed. Some of the existing PUC centres should be equipped with the capacity to collect and analyse OBD datasets. All the vehicles equipped with OBD should be tested at these centres. Vehicles failing the OBD tests should be tested at accredited centres as discussed below.
•**Accredited centres:** Vehicles found with deranged parameters in OBD systems will be asked to carry out further loaded mode testing using advanced technologies like OHMS (On-road Heavy Duty Vehicle Emission Monitoring Systems) or Lug down testing for diesel vehicles. Gasoline vehicles if found to be deranged as per the OBD standards, will need to go for advanced loaded mode testing, based on advanced testing procedure like ASM (Acceleration Simulation mode). Selecting a specific and suitable loaded mode test for vehicles requires further investigation.
•**In-use Vehicle Compliance Programme (IVCP):** The goal of this programme would be to ensure that vehicles actually comply with their original emission standards (Type Approval standards) throughout their useful life. Presently, there are no tests or screening done in India to check whether the vehicles are actually meeting their Type Approval standards throughout their useful life, provided the vehicle is maintained optimally.

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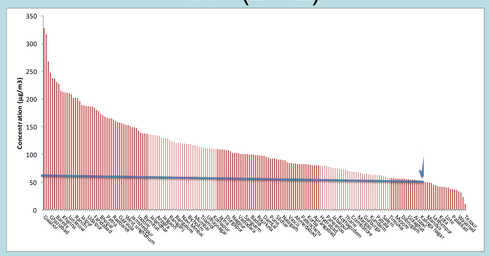
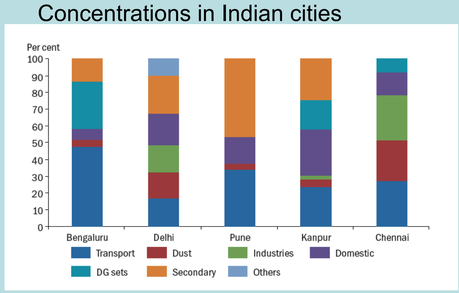
Background

- High PM pollution
- Transportation significant contributor
- Poorly maintained vehicles responsible for major share

PM10 concentrations in Indian cities (2012)

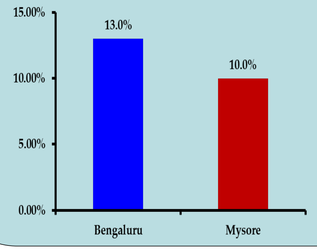


Share of different sources in PM2.5 Concentrations in Indian cities

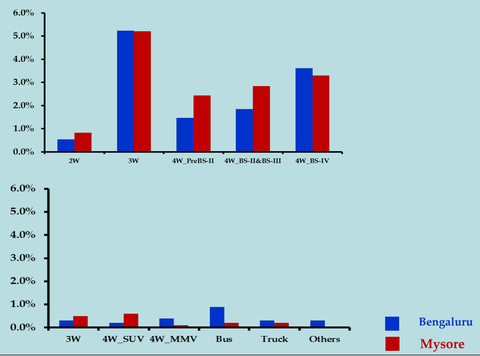


PUC testing in two cities

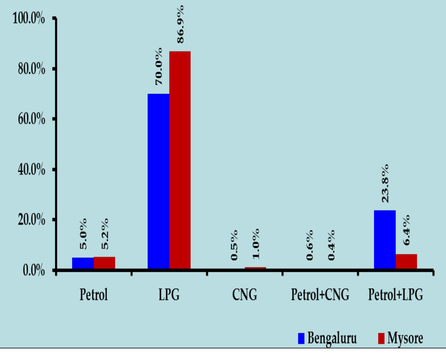
Percentage of registered vehicles undergo PUC test



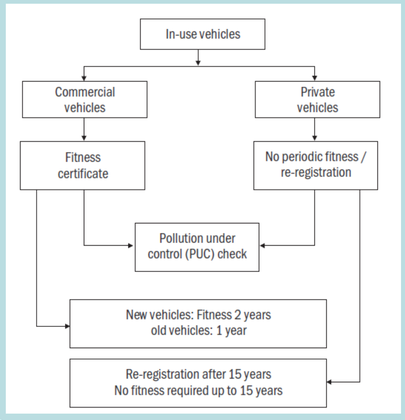
Failure rate of vehicle under PUC test



Failure rate of non-diesel 3-wheelers under different types of fuel use



Suggested improvements



PUC Reforms: Existing

Vehicle Owner Incentives	• Change to annual frequency • Link PUC certificate to insurance / re-registration? (previously proposed but never implemented)
PUC Centre Incentives	• Payment per test carried out, de-linked from pass or failure
PUC Centre Upgradation	• Add OBD capability, with link to accredited testing centres • Pilot and introduce LLSP (for diesel PM) and NDUV (for diesel NOx) • Introduce further anti-tampering features to PUC software
Strengthening Norms	• Notify norms for NOx in diesel vehicles (once technology piloted)
Better Enforcement	• Use visible stickers that are easily readable from a distance • Establish monitoring cell in state transport department to analyse PUC data • Information link to traffic police? Motor Vehicles (Amendment) Bill 2016 provision

Sequential Phasing

Technology scoping, Strengthen existing PUCs

- Technology pilots: for PUCs and accredited centres
- Pilot visible stickers and explore other PUC modifications
- Review of PUC networking with Delhi and/or KA
- Map IVCP process flow

Launch IVCP, Expand accredited centres

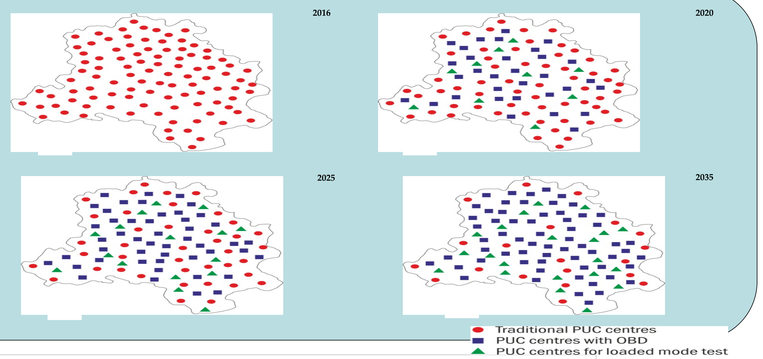
- Issue technical guidelines for new technologies
- Wider rollout of OBD in PUCs, pilot link to accredited centres
- Notify NOx norms for diesel
- Pilot IVCP study

Review IVCP data, Phase out of non-OBD PUCs

- All non-OBD vehicles directed to accredited centres
- Mandate OBD for all new vehicles
- Formalise and notify IVCP process, modify TA parameters as required

OBD based testing stations

To summarize, cities in India would have three kinds of testing centres – traditional testing centres for vehicles without OBD, OBD testing centres for vehicles equipped with OBD, and accredited testing centres for vehicles failing the OBD tests. By 2020, there would be minimal representation of vehicles with OBD in the total vehicular fleet. This number would then be expected to rise, assuming that all vehicles manufactured after 2020 will have OBDs installed. By 2035, vehicles without OBDs in the Indian vehicular fleet would start retiring and the need for OBD and accredited centres would rise and the number of traditional PUC testing centres would start decreasing. Figure 3 represents how the numbers of traditional, OBD, and accredited testing centres are expected to change if the suggested recommendations are implemented.



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