



INTERVENTION 3

Stricter Emissions Standards: Euro 3, then Euro 3 to 4, etc.

SUMMARY

Once basic fuel quality has been addressed and action taken on the worst diesel vehicles, the usual next step is to establish vehicle emissions standards. These standards effectively require improvement in vehicle and pollution control technology and along with upgrading the quality of fuel to allow the control technology to function effectively. There are several different sets of standards addressing fuel quality (USA, China, India among others), but the Euro standards are often used as a basic reference. Euro standards are aimed at reducing emissions and require cleaner fuels as a key input. They also set increasingly strict limits on the emissions of nitrogen oxides, total hydrocarbon, non-methane hydrocarbons, carbon monoxide, and particulate matter. At any time a country may have different Euro-equivalent standards in force for diesel and gasoline vehicles and for different classes of vehicles (light-duty, heavy-duty, private, etc.).

Control of fuel quality is a major issue in many countries, given the cost difference between high quality fuel and many sub-standard substitutes or additives. So-called “fuel mafias” operate in some places, selling contaminated fuels, which can wreck emissions systems and thus prevent air quality improvements from being achieved.

Health benefits: High. Moving the whole vehicle fleet from Euro 1 to Euro 6 would result in an overall reduction of more than 95% in particulate emissions. In dense cities where road vehicles can represent 30-50% of the emissions sources, this would achieve large air quality and health benefits. In reality, it typically takes years or decades to make this change via successive upgrading of requirements, and so it takes time for benefits to be seen.

Carbon benefits: Medium. The reduction in carbon emissions (measured as CO) from Euro 1 to Euro 6 would be about 80% and

there would also be significant reductions in black carbon as particulates are reduced. The contribution of transport to urban carbon emissions is about 23% (World Bank estimate) and therefore achieving full Euro 6 levels would have a considerable climate benefit.

Costs: Moderate. Upgrading vehicles to meet higher standards imposes costs on the owners. These typically include upgrading vehicles earlier than might otherwise happen. This can be a particular issue for heavy-duty vehicles, which are often old, costly, and a backbone of commercial transport.

Feasibility: Moderate, lengthy. Upgrading vehicle fleets—private and public, light and heavy—is a gradual process. The major standards systems (Euro and US EPA) address several categories of vehicles so that requirements can be introduced to match requirements and feasibility. The practical challenge is the pace of upgrading. Most



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systems, when introduced, apply to new vehicles only. In some cases, a period of time is established for older vehicles to be retrofitted or replaced.

Key players: National governments. All road users are potentially impacted by increased standards, and so introduction is gradual.

EXAMPLES

HONG KONG. From 1999 onward, the government has implemented measures to cut vehicular emissions, including an incentive program to replace diesel taxis and light buses with liquefied petroleum gas vehicles, the adoption of tighter fuel and vehicle emission standards whenever practicable, an incentive program to retrofit old diesel vehicles with particulate reduction devices, grants to help vehicle owners to replace their old vehicles with ones that comply with the prevailing emission standard for newly registered vehicles, stepping up the control on smoky vehicles, reduction of first registration

tax for environment-friendly vehicles, etc. The number of smoky vehicles has been reduced substantially as a result of measures taken to reduce vehicular emissions in recent years. Ultra Low Sulfur Diesel (ULSD) which is the Euro IV requirement for motor vehicle diesel became the only motor diesel fuel to be available from July 2000. The sulfur content in unleaded gasoline was reduced from 0.015% to 0.005% in January 2005. Hong Kong was the first place in Asia to introduce ULSD on a full scale for its vehicle fleet. The diesel and gasoline specifications have been Euro V level since 2010.

BEIJING started with tightening of emission and fuel quality standards as part of an integrated “Vehicle-Fuel-Road” framework. Subsequently, the focus of vehicle pollution control gradually changed from gasoline vehicles emissions to heavy-duty diesel vehicle emissions. The Central Government has introduced a stepped set of standards which broadly follow Euro approaches, but which are designed for Chinese conditions.

EMISSIONS STANDARDS FOR DIESEL ENGINES, MEXICO. In 2018, Mexico banned high-sulfur diesel throughout the country and switched to consumption of ULSD. Manufacturers/importers of new heavy-duty vehicles will have to move directly to EPA 2010 or Euro VI standards, skipping over any interim steps. Currently, most heavy-duty vehicles (HDV) in Mexico are required to meet the EPA04 standard, which was implemented in the United States 2004 and lags clean technology development and more recent emission requirements.

In 2014, the International Council on Clean Transportation (ICCT) carried out a cost benefit analysis of the proposed changes and concluded that updating NOM 044 is a highly cost-effective means of reducing the environmental impacts of diesel heavy-duty vehicles. While not quantified by ICCT, the regulation will likely result in real improvements in the efficiency of new engines sold in Mexico and the resulting fuel savings to end-users.



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DELHI: A range of actions has been initiated, including national vehicle emission limit Euro 3/III (and Euro IV in Delhi and other major cities) and leapfrogging from BS-IV to BS-VI emission norms by 2020 (BS-VI is equivalent to Euro VI). Fuel sulfur content limit nationally has been set at 350 ppm and 50 ppm in major cities. Public transport buses in Delhi are shifting from diesel to compressed natural gas (CNG).

The Supreme Court in 2001 passed an order for the compulsory conversion of all public transport vehicles (buses, taxis, auto rickshaws) plying in Delhi from diesel to CNG, which has lower emissions than gasoline or diesel. BS-VI grade fuel was introduced from April 2018, and efforts are being made to provide the fuel across NCR by April 2020. Cleaner fuels are also being introduced for buses.

CLEANER FUELS, BANGKOK. To reduce emissions from vehicles, new fuel quality standards were introduced, higher vehicle emissions standards were imposed, a mandatory vehicle inspection and maintenance program was implemented, and roadside pollution inspections began. The improvement in fuel standards commenced in the 1990s and began with moving Thailand off lead-based fuels and on to the Euro 3/III and then the Euro 4/IV emissions standards. (Mitchell et al 2014). The sulfur in diesel has fallen from 10,000 ppm in 1992 to less than 50 ppm in 2012 and will be 10 ppm by 2024.

VEHICLE FUEL STANDARDS, HONG KONG. The sulfur content in unleaded petrol was reduced in January 2005, in line with the European Union. Since April 2002, ULSD has been the statutory minimum requirement for motor vehicle diesel, three years ahead of the

European Union. The statutory motor vehicle diesel and unleaded petrol specifications have been tightened to Euro V level since 2010. The major difference between Euro IV and Euro V motor vehicle fuels (both diesel and gasoline) is the tightening of the cap on sulfur content.