

## **Post-2010 emissions standards roadmap for clean vehicles and fuels: Need decisions now**

### **India must not delay in setting the post-2010 emissions standards roadmap for vehicles**

India has implemented the Auto Fuel policy roadmap that was adopted by the Government of India in 2003 for the period 2005-10. Accordingly 13 cities have implemented Bharat Stage IV and the rest of the country Bharat Stage III emissions standards in 2010. Two and three wheelers have moved to Bharat Stage III norms.

But unfortunately till date no efforts have been made to set the emissions standards roadmap for the period 2010 to 2020. At the same time, the current practice of keeping emissions standards tighter for 13 cities and lax for the rest of the country, has created two new classes of citizens in India. This does not respect the fact that all citizens require equal level of public health protection in the country.

This is unacceptable given the fact that the vehicle production is expected to expand phenomenally in India in the coming decade and there is no benchmark to influence that investment for emissions gains. More delays will only increase the time lag and increase the life span of the polluting technologies that will lock up enormous pollution and carbon in the future. The estimates available from the Society of Indian Automobile Manufacturers Association (SIAM) shows that motor vehicle sales in India have nearly tripled during the last decade and in recent years hit the double digit growth – crossed 25 percent and this is expected to continue. The Auto Policy of the Government of India will also enable a lot of new investments. A quick decision on emissions regulations is this needed urgent to help the industry to decide the technology pathways to meet both clean emissions standards as well as fuel efficiency standards to minimize any trade-off between emissions and efficiency that may lead to unintended consequences.

Vehicles are a rapidly growing source of air pollution in Indian cities and contribute significantly to the key pollutants of concern – particulate matter, nitrogen dioxide, carbon monoxide, and a range of air toxics – setting the roadmap for 2015 and 2020 becomes urgent. This is needed both to meet the new air quality standards in the city as well as to reduce direct exposure to vehicle fume that occurs within the breathing zone of the majority of the urban Indians.

Studies in Delhi have shown that people living close to roads and while traveling on the road are exposed to pollution several times higher than the ambient levels. The short peaks of PM<sub>2.5</sub> levels can be several times higher than the permissible limit. Similarly, the Health Effects Institute study in Delhi has shown that 55 per cent of Delhi's 16 million people live within 500 meters of arterial roads which is most influenced by vehicular fume.

### **What is the status of the policy discussion on the matter today?**

The earlier Auto Fuel Policy 2003 had mandated source apportionment and emissions inventory studies in six cities to assess the contribution of different sources to pollution load. The results of these studies are to be the basis of the review of the next stage of emissions standards. These studies have been carried out under the aegis of the Ministry of Environment and Forests. Based on this the National Summary of the Pollution Inventory and Source Apportionment prepared by the ministry of environment and forests during the eleventh five year plan has identified key areas of interventions and has recommended inter-ministerial working groups to be set up by the different nodal ministries to develop a roadmap. This includes (i) Improvement of fuel quality & vehicle exhaust norms – roadmap beyond 2010; (ii) old vehicles – retrofitment of pollution control devices, scrap policy, inspection & maintenance issues, etc. (iii) Traffic management (iv)

Guidelines on cleaner construction practices (v) Industrial activities and industrial action plan implementation (vi) Road quality improvement and minimizing resuspension of road dust.

This would need to be carried forward to develop robust roadmaps for composite air quality management. The Ministry of Environment and Forests has already communicated to the concerned ministries about its recommendations on the formation of working groups.

The emissions standards roadmap for the vehicles will have to be expedited soon to be able to reduce/eliminate the technology lag by 2020 and meet the cleaner emissions benchmark. The National Summary of the Pollution Inventory and Source Apportionment studies of Ministry of Environment and Forests have recommended the steps towards setting the post 2010 emissions standards roadmap for the time frame of 2015-17 timeframe. These include:

- Progressive incremental introduction of BS IV from 2010 onwards
- Progressive incremental introduction of BS V/VI from 2015 onwards
- Electric vehicle to be 2 per cent of the city fleet
- Hybrid to be 2 per cent of the fleet
- 20 per cent shift in vehicle miles traveled to public transport

The deliberations on the future steps will have to be carried forward as quickly as possible so that India does not lose time and disturb the five year interval for each stage of emissions standards in place since 19091-92.

The Inter-ministerial group will have to be set up immediately to decide the timeline for the introduction of Euro V and VI emissions standards. Euro V emissions standards have already been introduced in Europe since 2008 and the Euro VI standards will come into effect in 2018. If India delays decision then the time lag will widen unacceptable. Already India is following Europe with 5-10 years lag. Despite new investments flowing in India will not benefit from the new technologies.

#### **New roadmap will have to consider the health and environmental imperatives motorisation**

The reason emissions standard roadmap has become so important is because Indian cities will have to set timeline to meet National Ambient Air Quality standards. In 2009 the Ministry of Environment and Forests has revised and tightened the National Ambient Air Quality Standards. The Eleventh Five Year Plan has made the mention that by the end of the plan period the major cities of India must meet the ambient air quality standards. Cities are required to frame a clean air action plan to meet the standards.

The most recent air quality data for the cities show that close to half of the cities have critical level of particulate pollution, in many cities nitrogen dioxide levels are rising; ozone is emerging as a problem as evident from the available data in some cities; the level of some of the air toxics – that are carcinogenic even at trace levels – are high than what is permitted.

In the meantime, more studies on evidences on health effect of air pollution in Indian cities as well as at global level have reaffirmed the insidious effect of air pollution. The particulates at any level remain a major health threat; newer pollutants have added to the crisis now; large number of studies are now available that show the health effects of nitrogen oxides, ozone, volatile organic compounds; etc.

While impact on respiratory health remains a major concern, more studies at local and global level have linked up air pollution with diverse non-communicable diseases including diabetes, hypertension, stroke, effects on foetus, cardiac problems and cancer. The new assessment from the Indian Council of Medical research and the world Bank have shown that the disease burden related to non-communicable diseases will add manifold to the disease burden in future. Both cancer and non-cancer effects of air pollution has become a matter of serious concern that will have to be addressed through the roadmap.

All these evidences as well as the needs of the new air quality standards will have to be considered for setting the terms of reference for the next stage of Auto Fuel Policy and to give a timeline for emissions standards for 2015 and 2020.

### **Control dieselization: Need priority strategies**

Global evidences show that there are serious health concerns over conventional diesel quality. The current emissions standards allow diesel cars to emit more NO<sub>x</sub> and PM. Dieselisation will add to the burden of particulate matter and nitrogen oxides, the two key pollutants of concern in Indian cities. Also according to WHO and other international regulatory and scientific agencies diesel particulates are carcinogens. Studies in Europe show even at the level of Bharat Stage III and IV the cancer potency of diesel emissions remains higher than the petrol emissions. Diesel particulate matter has been specially branded as probable human carcinogen. Other health end points have also been associated with exposure to diesel emissions. According to WHO and other international regulatory and scientific agencies including International Agency for Cancer Research, California Air Resources Board, US Environmental Protection Agency diesel particulates are toxic air contaminant and human carcinogens. The current emissions standards in India legally allow diesel-cars to emit more particulate matter and nitrogen oxides – that are the most serious pollutants of concern in our city's air. A 2004 World Bank study has found contribution of diesel combustion to the PM<sub>2.5</sub> load in cities like Delhi and Kolkata very high – a quarter to nearly 61 per cent in some seasons respectively.

However, it is possible to mitigate the diesel emissions if a certain quality benchmark is met for both diesel fuel and diesel technology. The more advanced emissions control technology including particulate traps can nearly eliminate diesel particulates but these can be implemented only if diesel fuel with 10 ppm sulphur is used. Higher level of fuel sulphur will damage the traps. Also fuel sulphur also contribute linearly towards formation of particulates. Similarly, the new technologies for controlling NO<sub>x</sub> emissions from diesel vehicles including SCR (Selective Catalytic Reduction) will also perform better with near zero sulphur fuels and minimize formation of ammonia sulfate, a deadly gas in the exhaust. Public health demands immediate action on diesel quality and dieselization.

It is therefore extremely misleading to justify to the Indian public on the basis of half truth that India can also dieselise at the current level of technology. It must also be noted that the European Commission has very recently calculated the difference in lifetime pollution costs of Euro IV compliant diesel car and petrol car. It shows the total pollution cost of a Euro IV diesel car is Euro 1195 as against Euro 846 for a petrol car. The European Commission says that this nullifies the marginal greenhouse gas reduction benefit of relatively more fuel efficient diesel cars.

### **Fiscal policies run counter to the objectives of public health. Diesel is subsidised in the name of agriculture and freight but is misused for luxury consumption in cars:**

It is ironic that while fuel tax differential has been officially justified in the name of agriculture and freight, the rich car owners have benefited more from it. Cars have already become the second biggest user of diesel and beneficiaries of the official fuel tax policy. The Kirit Parikh Committee report of 2010 -- *Report of The Expert Group on A Viable and Sustainable System of Pricing of Petroleum Products*, bears out that the cars use up 15 per cent of the total diesel in the country – compared to 12 per cent by buses and agriculture each, 10 per cent by industry, and 6 per cent by the railways. Kirit Parikh report and other expert reports of the Government of India have already recommended additional taxes on diesel cars to neutralise the effect of low tax diesel.

### **Government and oil companies sharing the burden of subsidy for the rich car owners**

It is unacceptable that the government should continue to incur a huge revenue loss as it earns much less from excise on a litre of diesel used by cars, as opposed to petrol. Revenue losses will compound with increased share of diesel cars and SUVs. Excise duty on petrol is Rs 14.35 a litre and diesel at Rs 4.60 per litre. At the same time the under recovery of costs is also huge. According to official information on the product-wise under-recovery of public sector oil marketing companies, the losses in the month of May was as big as Rs 16.17 on every litre of diesel sold. It had even gone up to more than Rs 19 per litre. Diesel price accounts for around 60 per cent of the under-recovery or losses of the oil marketing. The government continues to incur huge revenue losses on account of dieselisation of car segment as it earns much less from excise on a litre of diesel used by cars, as opposed to petrol cars. How can the government justify these hidden subsidies to the car owners?

**Need higher taxes on diesel cars to offset the incentive**

Expert committees have already proposed additional excise duty on diesel cars to offset the incentive from the fuel price difference. This must be effectively designed and implemented for an effective check. The additional revenue from this tax should be ploughed back into refineries to produce clean diesel as well as to improve other pollution control measures such as scaling up of public transport. It is deplorable that cars are not being made to pay the full costs when the oil companies are making enormous losses per litre of diesel.

**Dieselisation will also shift the car market towards bigger and heavier cars and SUVs and undermine energy security:** It is misleading to think that relatively higher fuel efficiency of diesel cars can help to address energy security concerns. It is important to note that cheaper diesel fuel also encourages bigger cars and SUVs, more driving and more fuel guzzling in the rebound. This defeats the objective of improving India's energy security. The market trend clearly shows that diesel is aiding steady shift towards bigger cars that guzzle more fuel. While 85 per cent of the petrol cars sold in India have less than 1200 cc engines, 64 per cent of diesel cars are just under 1500 cc and the rest of them above. Bigger engines will always use more fuel and cheaper diesel fuel will encourage customers to opt for bigger and more powerful cars and thus undermine energy security.

**Other Governments have taken fiscal measures to discourage diesel in cars.** In Brazil diesel cars are actively discouraged because of the policy to keep taxes lower on diesel. In Denmark, diesel cars are taxed higher to offset the lower prices of diesel fuel. In China, taxes do not differentiate between petrol and diesel. Sri Lanka has imposed very high duties for diesel cars which is as high as 300 percent. Even in India several official committees have asked for special and additional taxes on diesel cars to neutralise the incentive of cheaper diesel fuel.

We will strongly urge you not to support the ongoing dieselisation process based on conventional fuels and technology. We need bold and proactive decision to cut the toxic risks to the citizens. We will urge you to support fiscal measures to disincentivise dieselisation as well as introduction of clean diesel technology (10 ppm sulphur diesel fuel used with advanced emissions control systems and particulate traps) on a nationwide basis at the earliest so that current price distortions do not enhance public health risks in our cities.

**Set the terms for the new emissions standards roadmap for 2010-2020**

**i. Introduce Euro IV emissions standards nation-wide and move quickly to Euro V/VI standards:** The Bharat Stage IV emissions standards should be introduced nationwide by 2014 and Euro V/VI by 2018. The new emissions standards roadmap will have to harmonise with the current emissions standards in Europe and also enforce that on a nationwide basis to protect health of all citizens.

**ii. Introduce enabling clean fuels nation-wide:** Vehicles and clean fuels cannot be seen in isolation. While clean fuel is needed to reduce many of its own harmful components that contribute to toxic effects, it is also needed to enable use of advanced emissions control technologies to cut emissions. The new emissions control systems are very sulphur sensitive. If sulphur is not removed, these systems can be damaged and emissions control can be compromised. Currently, India produces two types of fuels -- diesel (50 ppm and 350 ppm) and petrol (50 ppm and 150 ppm). Both levels of diesel sulphur is an impediment to introduction of emissions control technologies.

The Government of India has a plan to progressively expand the 50 ppm fuels to 50 cities by 2015. There is a need of an additional strategy to reduce sulphur level to 10 ppm so that the advanced emissions control technologies including effective particulate traps can be used for effective elimination of harmful pollutants.

**v. Emissions standards roadmap for two-and three wheelers:** India has made substantial progress in improving the emissions standards for two and three-wheelers since 1990. Though standards are much tighter they are still not clean enough and emit more than a new car. Given the fact that they dominate the fleet and vehicle sales, it is important to set the next target to influence the technology pathways.

**vi. Strategies to keep real world emissions low:** The emissions standards roadmap will also require a supportive strategy to keep the real world emissions from in-use vehicles low on roads. This will demand a robust strategy for improved inspection and maintenance regime. With Euro V-/VI the Indian automobile market will enter a new genre of emissions control technology including particulate traps for particulate control, selective catalytic reduction for NO<sub>x</sub> control etc. Their in-use performance and monitoring will be of paramount importance to maintain the clean emissions. This will require more sophisticated levels of testing and inspection system. This will also require many in-vehicle checks to ensure that these systems are not compromised. 2013 onwards India will enforce on-board-diagnostic systems to track and monitor emissions and overall performance of the vehicles. But this technology will have to be integrated with the regulatory vehicle inspection programme as has been done in other countries. The roadmap will have to define the upgrades of the inspection programme in the country.

### **Enable refineries to produce 10 ppm sulphur diesel**

Indian refineries have just made a technology transition to produce 350 and 50 ppm sulphur high speed diesel, and 150 ppm and 50 ppm petrol. A fairly substantial part of the fuel stream is being hydrotreated to remove sulphur. Refineries in India are working at upgrading their configuration, capacity optimization, and yield improvement. The earlier Auto Fuel Policy had already identified some refineries as capable, of meeting the roadmap for petrol and diesel with minimal investment for post treatment. Since then capacity has further improved. Making right investment choices for the desired severity of sulphur removal is important instead of wasting time and resources over incremental process of upgrades. The few small refineries have poorer capacity but they form only 4 per cent of the refining capacity in the country. A transition package can be made for them.

It is also possible to consider financial package for targeted improvement of fuel quality. It is cheaper to leapfrog to 10 ppm sulphur fuel than move through intermediate targets. It is important to include health and environmental goals in fuel taxation policy. It is important to consider a time bound clean fuel cess or even a green tax on vehicles to raise funds to meet the cost of transition in the refinery sector. These fiscal strategies can be worked out.

There is a strong resistance to cleaning up of the fuels because of the increased refinery costs. Global studies have shown that the actual cost impacts on per litre of fuels is low and easily adjustable and affordable. The ICCT, Tsinghua University and Trans-Energy Research Associates study in China shows an incremental costs of only 0.09Rs/L for reducing sulfur levels in diesel from 350 ppm to 50ppm, and 0.31 Rs/L from 50 ppm to 10 ppm. For petrol the incremental cost from 150 ppm to 50 ppm is 0.05 Rs/L, while the cost to move to 10 ppm is almost four times, or 0.22 Rs/L. Similar estimates from the Energy Information Administration show that the additional cost of ULSD is around 0.4-0.9 Rs/L when moving from 350 ppm to S<10 ppm. Another ADB study also shows an insignificant cost increase for reducing the sulfur from 50 ppm to 10 ppm in Asia.

### **Find fiscal solutions to clean fuel roadmap**

Given the current level of under recoveries and the pressure of rising crude prices it may help to devise a fiscal strategy to fund the transition to clean fuels, It is estimated that refineries may require another Rs 40,000 crore to meet the cost to produce 10 ppm sulphur fuels. As it is increasingly becoming politically difficult to equalize or narrow down the price gaps between diesel and petrol, but dieselization of the car segment has continued unabated, it is important to make the diesel car pay for the clean fuel.

This strategy is consistent with the proposal of the Kirit Parikh report that an additional excise duty be imposed on the cars to neutralize the incentive from the cheaper diesel fuel. The report has proposed 81,000 rupees as additional excise duty on diesel cars to correspond to the differential with higher excise on petrol. This is expected to act as `the equaliser`. Though there is still significant scope of upward revision of the proposed rate of duty, there is need for urgent implementation of this approach.

Centre for Science and Environment has taken this step forward to estimate the expected revenue generation possible if this duty is imposed on diesel cars. It shows that if a dedicated fund for fuel quality improvement is made out of the revenue from this duty, India can mop up more than Rs 40,000 crore by 2016 from the diesel car sales expected in the country. This is enough to meet the one time capital investment in the refineries.

It is now important to focus on the solutions. Fiscal strategy offers an important way forward and to break the current impasse.

It is important to note that though the refineries have come under massive stress from the rising crude oil prices, the last five years have also witnessed unprecedented refinery expansion. Nearly, all planned projects have been implemented. There are 20 refineries in India with 17 in the public sector and 3 in the private sector. The total refining capacity is 184.4million metric tonnes per annum (MMTPA). This may increase to 198.0 MMTPA. But a further increase in refining capacity will lead to total capacity of 261 MMTPA by the end of 2013, which is a 41.8% increase from the 2010 figure of 198 MMTPA (TERI).

It is therefore, important to set the emissions standards roadmap immediately to pave the way for clean vehicle technology to protect public health.