

## Strategies to reduce air pollution from trucks entering and leaving Delhi October 07, 2015



### Background

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The Hon'ble Supreme Court has been concerned about the pollution of trucks entering and leaving Delhi for the past decade.

In its order of December 6, 2001, the Hon'ble Supreme Court had banned entry of non-destined commercial transit traffic effective from January 15, 2002. These vehicles could enter only on payment of toll and tax for transportation of goods to and from Delhi.

Then in its order of 11.2.2005, 11.3.2005 and 1.8.2005 the Hon'ble Supreme Court had ruled, "that no corridor joining different highways should pass through Delhi". Subsequently, the Supreme Court had directed to construct Western Peripheral Road also known as Kundli-Manesar-Palwal Expressway and Eastern Peripheral Expressway to take the non-destined trucks away to decongest Delhi.

Subsequently, EPCA has continued to monitor progress in the above directions and has brought the matter of delay and non-implementation of the above directions to the attention the Hon'ble Supreme Court. The Hon'ble Supreme Court, driven by concern for growing pollution, has passed orders and directed for expeditious completion of the bypass. EPCA is constrained to bring the matter to the attention of the Hon'ble Court and to look for alternative strategies to control truck traffic for the following reasons:

- a. The ban on non-destined vehicle entry to Delhi has proved to be difficult to enforce. This is because of lack of turn-around facilities and difficulties in identifying definition of vehicles, because of the lack of required paperwork at the national level. This is evident from the data presented by MCD to EPCA, which states that out of the total number of trucks, which entered Delhi between May 16, 2015 to June 30, 2015, a mere 0.1 per cent were non-destined and were turned back.

- b. There is inordinate delay in building the bypass for Delhi, the Western Peripheral Expressway (WPE) and Eastern Peripheral Expressway (EPE). As per the current status, the WPE will be completed not before July 2018. As reported to EPCA by Haryana government (HSIIDC) there is delay in commissioning of work on the longer segment between Kundli-Mansesar (83 km out of 135 km). The EPE will be completed also by July 2018 at the earliest according to NHAI.

In the meantime truck volumes and their pollution load have increased manifold. Delhi, as the Hon'ble Supreme Court, is well aware, has now got the dubious distinction of being the most polluted city in India and perhaps even the world. This is putting a huge health burden on its people. The need, therefore, is to look for urgent solutions out of the current crisis.

## **2. Assessment: How many trucks enter Delhi?**

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There has been a lack of clarity on the number of commercial vehicles, including trucks that enter or leave Delhi each day. There are a total of 127 entry points, of which 9 are major. The MCD has tendered out the operation of collecting toll at these entry points to a private concessionaire. The reserve price was announced as Rs 541 crore annually for a tender for 3 years.

The Centre for Science and Environment (CSE) taken note of the study that was commissioned to M/s V R Techniche Consultants Pvt Ltd to accurately estimate the number of commercial vehicles entering and leaving Delhi at all key toll points. This study was conducted to get an independent estimate and also to verify MCD data. The traffic count survey was conducted by using 24 X 7 video recording method at fixed spots near selected entry points between June 29 and July 18, 2015. It has counted all categories trucks and other commercial vehicles that feature in the MCD database. These include mini light goods vehicle, light goods vehicle, 2-axle trucks, 3-axle trucks, 4-axle trucks, 5-axle trucks, 6-axle trucks, and more than 6-axles. The survey was done continuously for 24 hours on the days of the surveys from 8 am to 8 am and counted trucks both entering and exiting Delhi.

This survey was conducted on representative 9 entry points, which according to MCD account for close to 75 per cent of the total commercial vehicle entry into Delhi.

These selected entry points include

1. Kundli border on NH1 (KGT Main),
2. Tikri border on NH10,
3. Rajokari border on NH8,
4. Badarpur border on NH2,
5. KalindiKunj,
6. GhazipurMainon NH24
7. Ghazipur Old
8. Shahdaralstborder on NH-19
9. ShahdaraFlyover

**Map 1: Survey Locations**

The study found the following:

**The number of commercial vehicles entering and leaving Delhi and therefore, crisscrossing the length of the city is massive. On a daily basis some 38,588 commercial vehicles (excluding taxis) enter Delhi. If this is extrapolated to the 127 entry points then a total of 52,146 commercial vehicles (excluding taxis) enter Delhi.**

The survey had measured vehicles in both directions. And while it is difficult to know if the same vehicle has entered and then left Delhi on the same day, it is clear that the total number has an imprint on Delhi's air, as these vehicles will traverse through the city and add to emissions. The daily average number of light and heavy goods vehicles that enter and exit from the 9 points are 85,799. The total commercial light and heavy duty trucks entering and leaving the city are 1,15,945 each day. **The official estimate of the number of trucks that cross Delhi borders is grossly underestimated and is unreliable in calculating the pollution load from trucks**

MCD data given to EPCA provides information on the total number of commercial vehicles, including trucks that have entered Delhi for the period of May 16 2015 to July 31 2015. This data overlaps with

the data collected in the survey. CSE matched the MCD category of vehicles (category 2 to category 5<sup>1</sup>) with its survey to get an assessment of the numbers.

According to MCD data, on an average only 22,628 commercial vehicles, excluding taxis, enter Delhi each day, as against the 38,588 commercial vehicles counted by CSE survey – almost 16,000 vehicles less. This is an underestimate of about 70 per cent in the number of trucks entering from the 9 entry points. (See Table 1).

Thus, according to MCD the total number of light and heavy trucks that enter Delhi every day is 30,373. This is even lower than what the CSE survey counted at 9 entry points. In this way, the survey establishes that the official numbers of truck entry into the city are a gross underestimation and they end up seriously under-estimating the health impact of these vehicles in the city.

**Table 1: Comparison between CSE & MCD data in daily average trucks (Category-2 to Category -5) entering Delhi from selected 9 entry points**

Location	Entry Point(s)	Comparison between CSE & MCD Data (Daily Average) from 16.05.2015-31.07.2015		
		CSE	MCD	Difference (%)
Kundli Border/NH-1	KGT Main	8369	4554	84
Tikri Border on NH-10	Tikri	3700	1890	96
Rajokari Border on NH-8	Rajokari	9919	6335	57
Badarpur	BFTL (Badarpur Toll)	4460	3001	49
KalindiKunj	KalindiKunj	4271	2275	88
Ghazipur	a)Ghazipur Main	3914	2372	65
	b)OldGhazipur			
Shahdara	a)ShahdaraIst	3955	2201	80
	b)Shahdara Flyover			
<b>Total from 9 entry points</b>		<b>38,588</b>	<b>22,628</b>	<b>71</b>
<b>Total from all 127 Entry Points</b>		<b>52,146</b>	<b>30,373</b>	<b>72</b>

Source: CSE Traffic Count Survey & MCD Data for toll entry between 16.05.2015 to 31.07.2015

## 2. Assessment: Estimation of pollution load from trucks

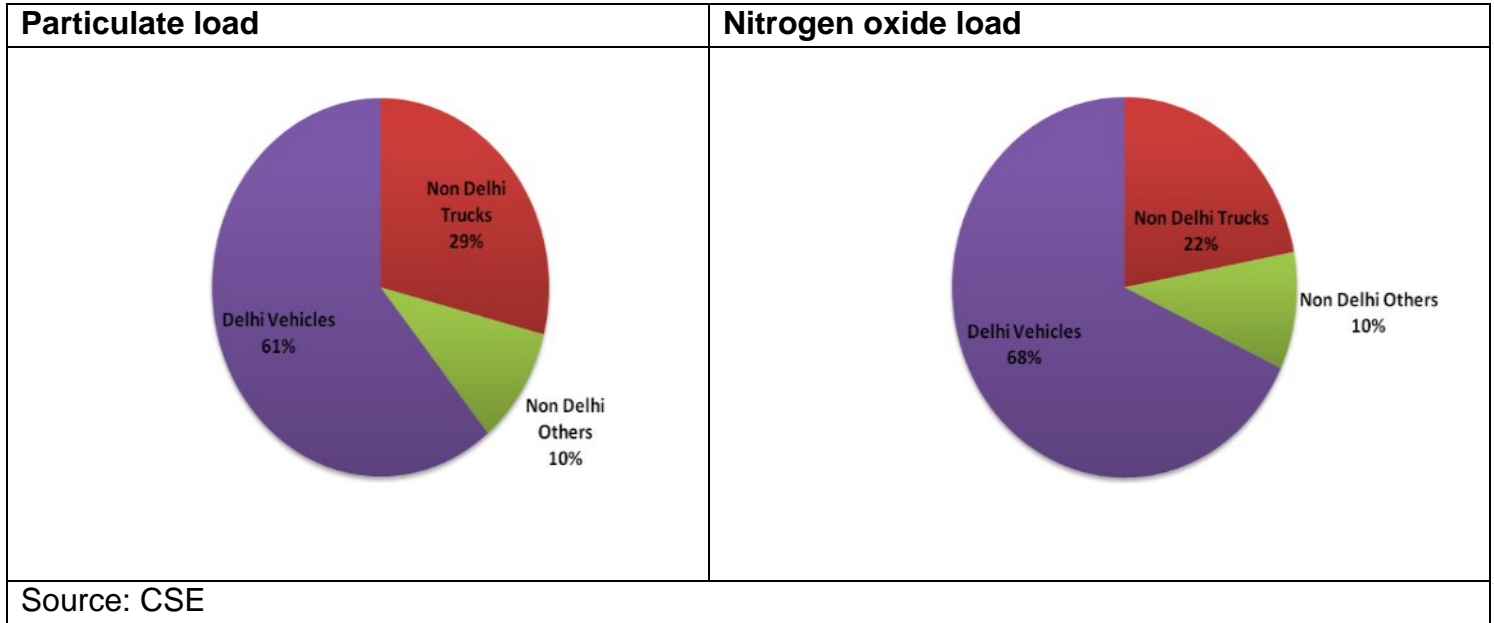
Emission factors of different types of vehicles (with certain assumptions made for age and generation) was used to estimate the total pollution load from vehicles and the contribution of light and heavy duty trucks entering the city

As per this estimate, Delhi's own vehicles are responsible for 62 per cent of the particulate load from the transport sector and 68 per cent of the NO<sub>x</sub> load. **The total number of light and heavy trucks that enter Delhi spew close to 30 per cent of the total particulate load and 22 per cent of the total nitrogen oxide load from the transport sector.** This is clearly a massive loading of toxic

<sup>1</sup> MCD category of vehicles: Category 1 (cars/taxi); Category 2 (bus/LCV); Category 3 (2 axle truck); Category 4 (3 axle truck); Category 5 (4 axle and MAV)

pollution. Without any restraint on the movement of these trucks, Delhi's battle against toxic pollution cannot be won.

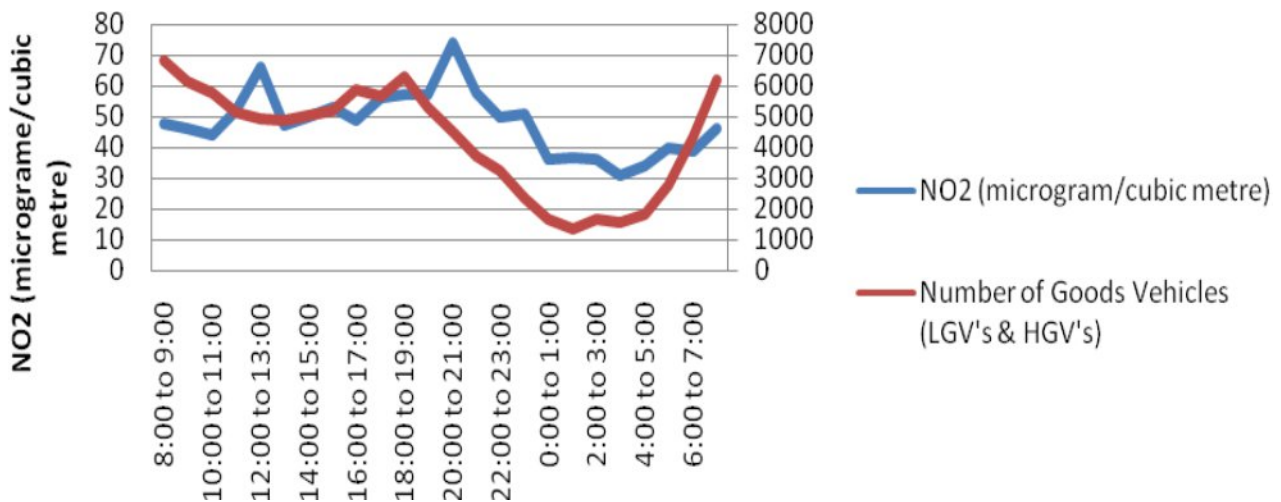
**Graph 1: Percentage contribution from Delhi and Non-Delhi vehicles to Particulate Matter load in Delhi**



**3. Assessment: How does this emission impact Delhi's air pollution**

The CSE survey includes information on the time of entry of all commercial vehicles. When this movement of vehicles is correlated with pollution data, a clear trend emerges. The pollution is highest in the city during the time when there is movement of heavy trucks.

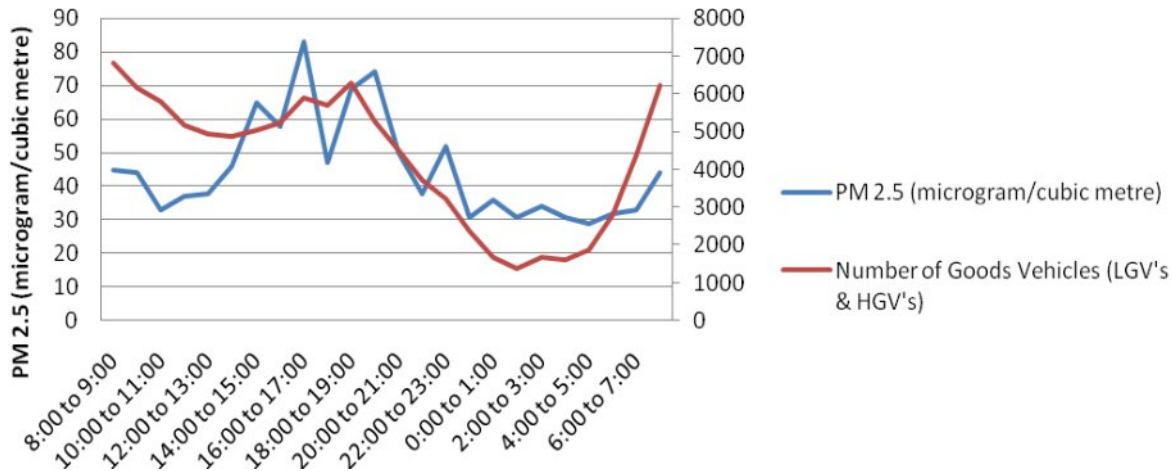
**Graph 2: Hourly relation in number of trucks entering Delhi with NO2**



Source: CSE



**Graph 3 : Hourly relation in number of trucks entering Delhi with PM 2.5**



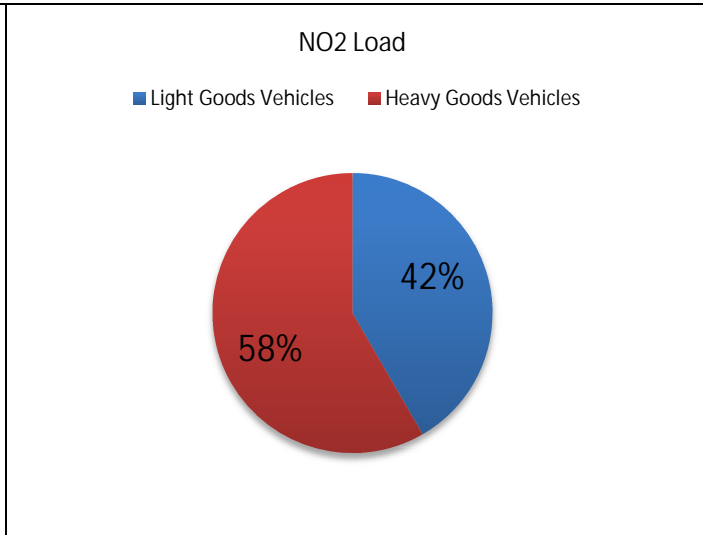
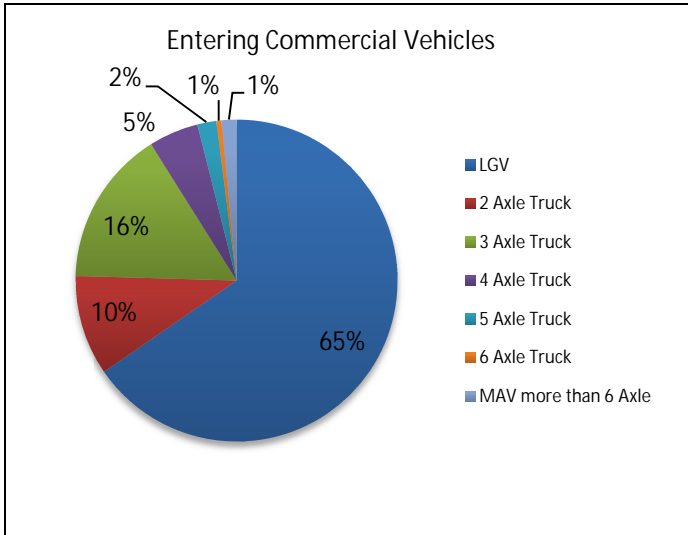
Source : CSE

**Assessment: Which vehicles contribute most to pollution load**

Light good vehicles constitute 65 per cent of the total commercial vehicles entering Delhi; they contribute 39 per cent of the particulate matter load and 42 per cent of the nitrogen oxide load from the commercial vehicles entering Delhi. Heavy duty trucks though are a quarter of the commercial vehicles entering Delhi they emit 61 per cent of particulate and 58 per cent of the NOx load from the commercial fleet entering Delhi. Among the heavy duty trucks the 3 axle trucks, which is 16 per cent of the commercial vehicle numbers are among the highest emitters entering Delhi.

**Graph: Share of LGV's and HGV's and their Particulate Matter and NOx load**

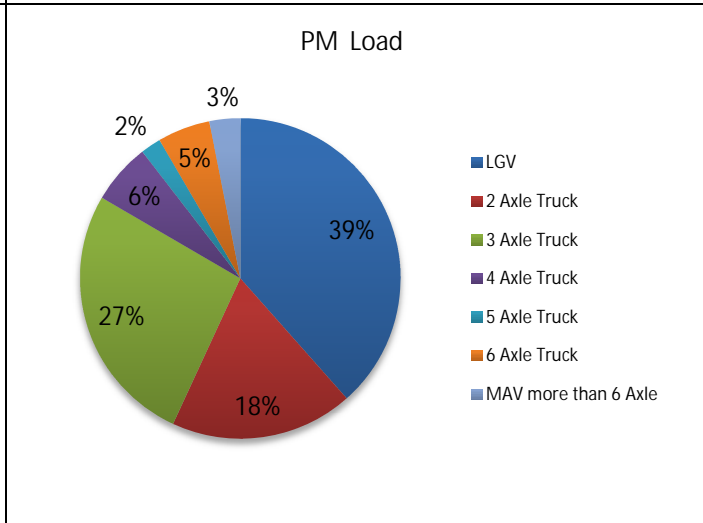
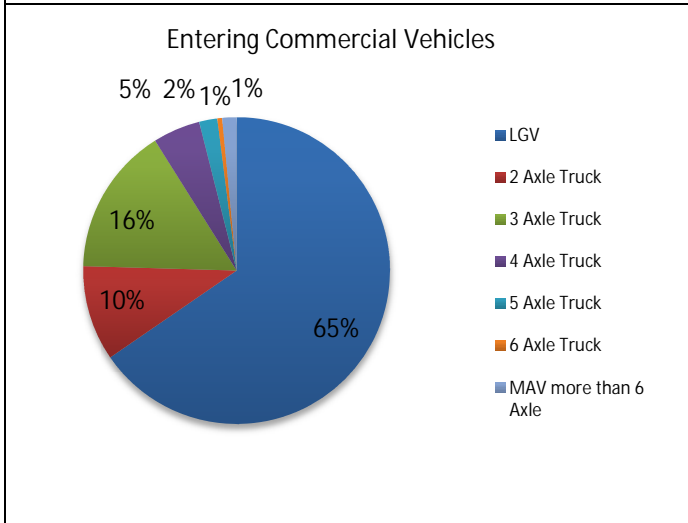
Share of different truck segments entering Delhi	Particulate load from LGV's and HGV's
<p>Entering Commercial Vehicles</p> <ul style="list-style-type: none"> <li>■ LGV</li> <li>■ 2 Axle Truck</li> <li>■ 3 Axle Truck</li> <li>■ 4 Axle Truck</li> <li>■ 5 Axle Truck</li> <li>■ 6 Axle Truck</li> <li>■ MAV more than 6 Axle</li> </ul>	<p>PM Load</p> <ul style="list-style-type: none"> <li>■ Light Goods Vehicles</li> <li>■ Heavy Goods Vehicles</li> </ul>
<p>Share of different truck segments entering Delhi</p>	<p>Nitrogen oxide from LGV's and HGV's</p>



**Graph: Share of different truck segments and PM and NOx load**

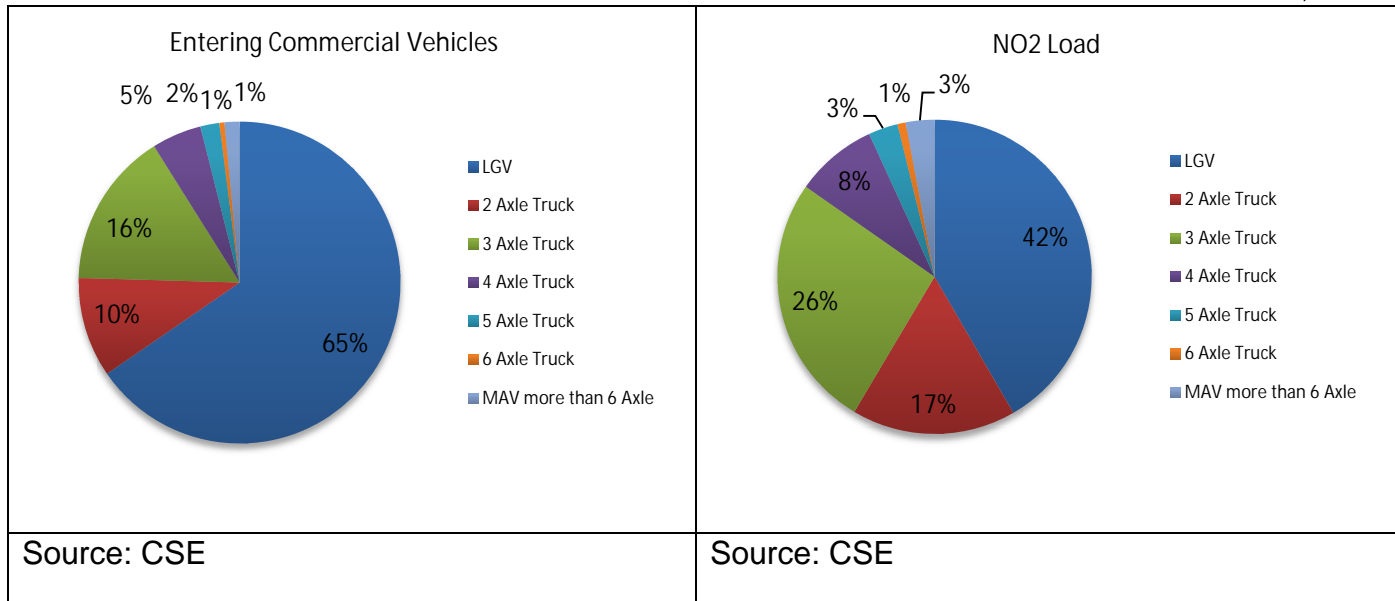
**Share of different truck segments entering Delhi**

**Particulate load from different segments of trucks**



**Share of different truck segments entering Delhi**

**Nitrogen oxide load from different segments of trucks**



#### 4. Assessment of non-destined traffic

There is no reliable data on commercial traffic that is not destined for Delhi. The MCD data shows that the trucks turned back, in compliance with the order of the Hon'ble Supreme Court at a mere 0.3 per cent of the total traffic. In other words, even taking the MCD estimate of the numbers of light and heavy vehicles, just 90 such vehicles were not destined for Delhi and the rest 29,000 needed to do business in the city.

On the other hand, conducting a travel destination study has huge drawback, as drivers do not provide accurate or correct information. A rapid diagnostic survey was done in 2014 only on the roads approaching NH 1 and NH 10 entry to Delhi. Truck drivers were randomly surveyed and asked about their origin and destination, about trip and commodity carried. This rapid and limited survey found that some 23 per cent of all commercial vehicles travelling on NH 1 were not destined for Delhi. In the same survey it was found over 40-60 per cent of heavy trucks (3-axle and above) were not destined for Delhi. But it is also clear that it is not possible to distinguish between such vehicles and strategy must be designed so that all light and heavy-duty trucks are covered.

#### 5. Strategy to reduce pollution from trucks

It is clear that the delay in building the two expressways has lost the city dear in terms of pollution. But it is also clear that given the coming winter and the increase in pollution, we need to find urgent options.

In this, it has come to know that while there are some viable options available to bypass commercial traffic, these roads are not favoured by transporters. There are alternative highways that exist on the western side of the city, to transport goods between north India and west and south India. This is the most important commercial traffic route. But trucks prefer to traverse through Delhi and not take these alternative highway roads, in spite of the fact that there is no apparent and real difference in length.

The key reason is the fact that it is cheaper to travel through Delhi than to take these alternative roads. The reason being that these roads are toll roads and charge based on rates decided by the



National Highway Authority of India (NHAI). The road that cuts through Delhi has a lower charge that is based on rates decided by the Municipal Corporation of Delhi.

For instance, NH 71 and NH 71A are toll roads that connect Rewari via Jhajjar and Rohtak to Panipat(see map). This means that commercial traffic, which is travelling from north India to west via Jaipur and then to south India could take this route. It would not need to travel through Delhi. But the toll rate for the 3-axle trucks to travel on this road is Rs 1420. If the truck travels through Delhi it is required to pay the MCD toll, which for a 3-axle truck would be Rs 450.

The length of the trip is not much different, while travelling via NH71 and NH 71A is 172 km, travelling through Delhi is marginally shorter at 163 km.

**Table 3: Comparison of toll rates along alternative routes around Delhi**

Comparison of Toll Rates along various Alternatives						
Route (From Panipat to Rewari)		Length, in Km	Toll for	Toll Rate	Toll for	Toll Rate
			LGV	2-axle Trucks	3-axle Truck	4-axle and above
<b>Alternative 1</b>	NH71A - NH71 (Through Rohtak)	172	450	930	1420	1550
<b>Alternative 2</b>	Through Delhi	163	120	225	450	1120



It is also clear that travelling to the east of India – from north to east via Agra, there are fewer ready highways that can obviate the need to traverse through Delhi. But the fact is that travel through Delhi needs to be charged so that there is a clear disincentive for the use of these roads, the cost of pollution is paid for and there is an incentive for viable options to be built that do not require going through the already congested and polluted airshed of Delhi.

Imposing this charge will reduce the traffic that has options not to travel through Delhi immediately. It will also create conditions for traffic that is not destined for the city, to look for alternative routes.



## 6. Recommendations for urgent steps to reduce truck pollution

Delhi cannot fight its pollution battle without addressing the enormous pollution contributed by the trucks crossing Delhi's borders daily. While urgent steps are needed to complete the two expressways –western and eastern – it is possible to take additional steps in the short term to reduce pollution load from trucks before this winter. It is therefore recommended:

- 1. To implement pollution compensatory charge on all light and heavy-duty trucks entering Delhi** as an additional charge to the MCD toll. This should be done as a way to equalize the difference between toll roads and travel through Delhi. The suggested rates are as follows:

	Category 1 (taxi)	Category 2 (LCV)*	Category 3 (2-axle)	Category 4 (3-axle)	Category 5 (4-axle)
Current toll	Rs 65	Rs 120	Rs 225	Rs 450	Rs 1120
Additional Charge	Nil	Rs 600	Rs 600	Rs 1200	Rs 1200
		<b>Rs 720</b>	<b>Rs 825</b>	<b>Rs 1650</b>	<b>Rs 2320</b>

Taxis are being exempted as they provide options for public travel. Similarly, in category 2 buses should also be exempted, as there is need to make this travel cheaper and viable to take away from private car travel.

- 2. There is a need to implement Radio-Frequency Identification (RFID) on trucks:** The RFID scheme will enable electronic payment and to track them electronically as they pass through the tollbooths. This will help to identify non-destined trucks with greater precision and will make management easier. NHAI has directed for nationwide roll out of RFID for commercial vehicles, but implementation is slow.

This can be easily implemented in Delhi, as technology is available and relatively cheap to install on every truck. The contract given by MCD to the private operator includes the provision to move towards RFID. But no deadline has been given and there is clearly no incentive for the operator to move towards RFID, which would reduce the dealings in cash considerably.

- 3. There is a need to introduce Bharat Stage IV emissions standards nation-wide by April 2016:** Emissions levels from trucks cannot be lowered effectively if trucks continue to run on outdated technology and highly polluting fuel. The current Bharat Stage III standards that apply to trucks across the country are 15 years behind Europe. As trucks have a 15-year life, any delay in bringing in better technology or fuel, means more polluting on-road vehicles. Cleaner fuel is also required nationwide as trucks travel long distances. The current draft standards issued by the Ministry of Surface Transport and Highways requires inter-state (truck) traffic to move to Bharat Stage IV only in April 2017. This delay is unacceptable.