



Study of BS6 Technology in Automobiles and the Indian Economy

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ABSTRACT: The BS or Bharat Stage are emission standards brought in existence by the Government of India to keep a check on the emission of air pollutants from vehicles. These standards and the given norms were passed and instituted in 2000. With upgraded technology being implemented in generation of new fuels and upgraded Automobile technology, they limit and control the emission levels and content of pollutants such as carbon Monoxide, Nitrogen Oxide, other hydrocarbons, also many particulate matter (PM) alongside sulphur oxides from motor vehicles which are using internal combustion engine (IC). When the norms or stage gets upgraded, the control levels on the emissions becomes much stricter. Thus BS VI is a two level upgraded version of BS IV. These norms are inspired from norms instituted in Europe namely Euro 4 and Euro 6.. Along with the environmental aspect of the BS VI norms, there are bigger concerns in the economic influences of it. This paper will put light on the basic study of BS VI norm and the implementation of its, concluding with what were its effect on the Indian Industries and India economy..

Keywords: Bharat Stage norms, Particulate matter.

1 INTRODUCTION

India has been following the regulatory pathway for fuel quality and vehicle emissions standards known as Bharat Stage (BS). Various types of norms are being instituted with suggestions from which are set up according to the standards which are set by the CPCB or Central Pollution Control Board, India (under the Ministry of Environment and Forests and Climate Change, India). Bharat Stage Emission Standards are the emission rules set/ implemented by the government of India, to keep a regular check on the emissions from motor vehicles being sold in India, which on the other part helps in checking Pollution levels in India.

Bharat stage VI is the new emission standards set up for the vehicles of India by the government of India, which has to be implemented from April 01'2020 as per the Judgment/ Ruling of Supreme Court on October 24,2018 ¹ which also states that no BS IV vehicle shall be put into sale from April 01, 2020. To meet international best practices, the Government has decided to rise directly from BS-IV to BS-VI grade omitting BS-V altogether.

BS-VI enabled petrol cars are made to emit no more than 60mg/km of NO_x (Nitrogen Oxides) emissions, which in the case of BS IV vehicles is of 80mg/km.. The particulate matter (PM) limit is covered at 4.5mg/km for petrol

engines which work on direct Injection. For diesel cars, NOx emissions are reduced to 80mg/km from 250mg/km, HC+NOx to 170mg/km from 300mg/km, and PM to 4.5mg/km from 25mg/km. ²

Table 1. Dates of implementation of BS III and BS IV norms^{3,4}

Vehicle category	BS III Implementation date	BS IV Implementation date
Category : M, N MOTOR vehicles With GVW less than 3,500 kg	2005 in select states and cities 2010 whole nation	2010 in select states and cities 2017 in whole nationwide
Category : M, N MOTOR vehicles With GVW greater than 3,500 kg	2005 in select states and cities 2010 whole nation	2010 in select states and cities 2017 in whole nationwide
Two wheelers	whole in 2010	whole in 2017
Three wheelers	whole in 2010	whole in 2017

Table 2. Notable specifications for BS VI ⁴

Type of fuel	parameter	in Units	specs
Regular grade gasoline	RON or research octane number	—	91
	MON or Motor Octane Number	—	81
	Max. olefin content in fuel	% v	21
	Max. oxygen content in fuel	%m	2.7
Diesel	Max. 95% distillation B.P. in fuel	°C	370
	Density at 15 °C	kg/m ³	820-860
	Max . polycyclic aromatic hydrocarbon (PAH) content in fuel	% m	11

BS-IV AND BS-VI

The basic difference between the existing BS-IV and new BS-VI auto fuel norm is the presence of sulphur.

- The BS-VI fuel is estimated to bring around 80 per cent reduction of sulphur, from 50 parts per million to 10 ppm.

- This key reduction in sulphur makes it possible to equip vehicles with better catalytic converters that capture pollutants.
- BS VI standard shall help to bring down the quantity of NO_x or oxides released due to petrol vehicles by 25%² and by diesel engines to 70%.²
- The BS VI fuel contains 5 times less the sulphur than in BS IV fuel.
- BS-VI enabled petrol cars are made to cause emission of not more than 60mg/km of NO_x (Nitrogen Oxide), 80mg/km as in case of BS IV vehicles . The particulate matter (PM) emission limit will be kept 4.5mg/km for the engines working on petrol (direct Injection) As, for working on diesel cars, the emission of NO_x is reduced from 250mg/km to 80mg/km, HC+NO_x from 300mg/km to 170mg/km, and PM from 25mg/km to 4.5mg/km.²

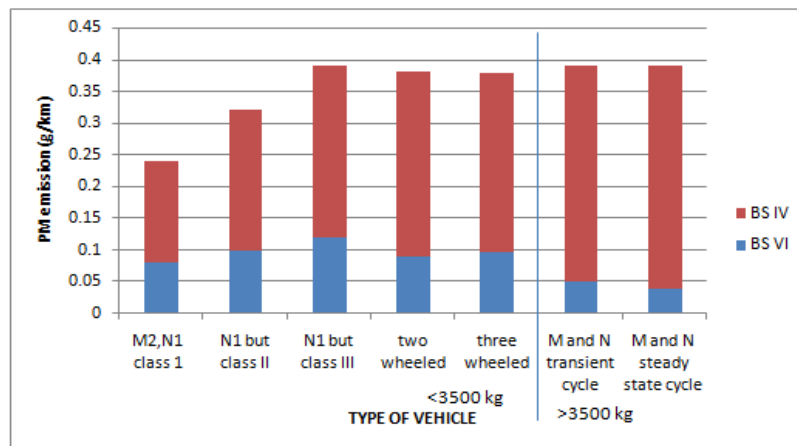


Figure 1 : PM Emission (g/km) vs Type of vehicle (comparing BS IV and BS VI)

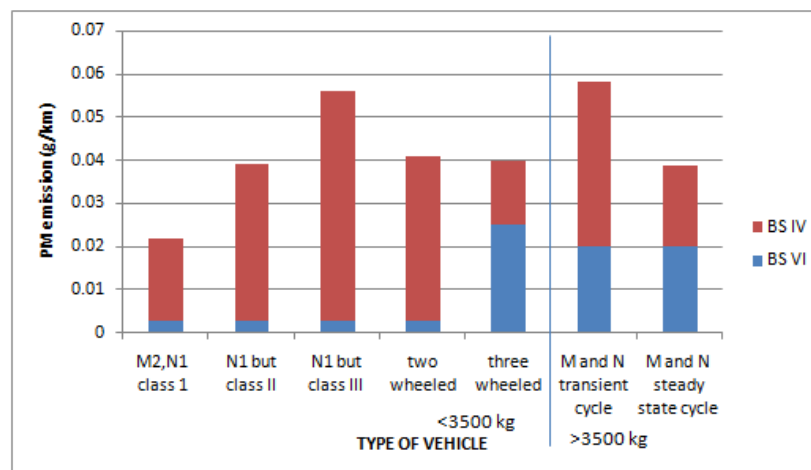


Figure 1 : PM Emission (g/km) vs Type of vehicle (comparing BS IV and BS VI)

Figure 1(a) ,1(b). various comparative parameters are being shown here on BS IV and BS VI (compression ignition engines).⁴

The Supreme Court's Ruling dated 24.10.2018 ¹

- The judgment was to be made on the problem that BS IV vehicles are to be sold / registered after 31.03.2020 or not. In an earlier judgment on 13.04.2017 the detailed reasons that vehicles supporting BS IV will be sold by manufacturers or car companies in any vehicle category
- In 2003 government of India announced national auto policy on the recommendations of Mashelkar committee which was constituted in 2001 which made BS 4 compliant vehicles compulsory within various states on different dates ranging from 1.04.2005 and so it had been unfolded in country since the starting of 01.04.2010 then on 21.05.2010 and 14.07.2015 more cities were added to that and so amendment dated on 19.08.2015, made compulsory that BS4 should acquire force throughout the country before 01.04.17.
- And hence it had been made compulsory to not sell/register vehicles not complying to BS4 norms after 2017.
- Society of Indian automobile manufacturers (SIAM) submitted that they weren't denying the manufacturing of BS4 vehicles but they must run a while to sell all the stocks of non BS 6 vehicles so they'll pack up them.
- The manufacturer raised the priority that BS6 fuel are going to be available within the entire country only from 1st April 2020 and hence the manufacturer shouldn't be stopped from production on 31.03.2020 overnight because it isn't feasible for manufacturers to change over to BS 6 vehicles overnight as they must run some reasonable time for the selling of all the non BS 6 vehicles and aligning the new technology within the ongoing technology.
- The changing of the introduction date of BS 6 fuel from 2024 to 2020 and not the introduction of BS 5 vehicles was creating plenty of difficulties to the manufacturers.
- Ruling was made by the supreme court by taking many considerations like of World Economic Forum for the world's most polluted cities statistics dated on 03.05.2018 and statistics provided by world health organization (WHO) on the cities of India were taken into consideration. The concern of pollution and growing pollution in India was taken highly into consideration which made it highly difficult for the supreme court to administer any time beyond regulation to the manufacturers of automobile
- The point was raised that since 2018 to 2019 the govt has spend an amount of rupees 30000 crore for the assembly of BS 6 fuel for it to be completely implemented on 01.04.2020

The Supreme Court then passed the ruling that from 01.04.2010 only vehicles complying to Bharat stage VI Vehicle shall be sold or registered within the entire country from 01.04.2020

The impact on Industries due to above ruling :

If the following rule is bought and implemented, a large amount of stock of BS4 vehicles will not be able to sell as it will have to be discarded immediately. This will be a very big market loss to the manufacturers of the cars as they have to dump all the non-BS VI vehicles. Alongside this, they have to put more and more investment on the introduction of BS VI technologies which will giving them another burden on their investment part.

As the prices of BS 6 vehicles will be Rupees 11,000 to 20,000 more than the BS4 vehicles the selling of the cars

with BS VI engines will be facing setbacks in the market itself. Also the prices of BS VI, fuel as the oil refinery companies are being invested by an amount of Rs 30,000 crores¹ by the Indian government and the manufacturing plus maintenance of such kind of fuel is more costlier than BS4 fuel, as it causes a very less amount of pollution as compared to BS4 fuels which involve introduction of many advance technologies. The introduction of public transport and various Technological reforms in the Transportation sector which provide a much feasible solution for a less costlier travel will also be a governing factor for the automotive industries profit.

Impact on Indian Economy:

Car sales in India had decreased in July'19 by 31% than in July'18⁵, the introduction of BS VI was one of the major factors in this Slowdown.

As stated earlier, Supreme Court's ruling post 1st April 2020 only BS6 cars will be available in the market people were planning to buy contemporary BS 4 cars are disturbed about the merit of re- sale in future so the customers are holding the conclusion to buy BS4 cars due to this confusion of their which is causing the slow down of the sale of BS IV cars and hence hampering the Indian economy.

For example: India's largest car maker Maruti Suzuki⁵ is impotent to upgrade its diesel engine vehicles from BS IV technology to BS VI technology due to high cost and unavailability of expertise.

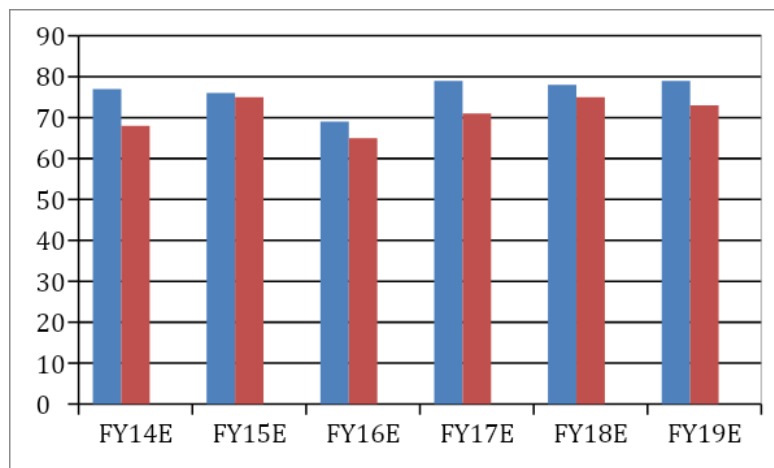


Figure 3: SUB-OPTIMAL USE OF FACTORIES ⁵

(Blue: Two-wheelers, Red: Four-Wheelers, Y-axis: Percentage)

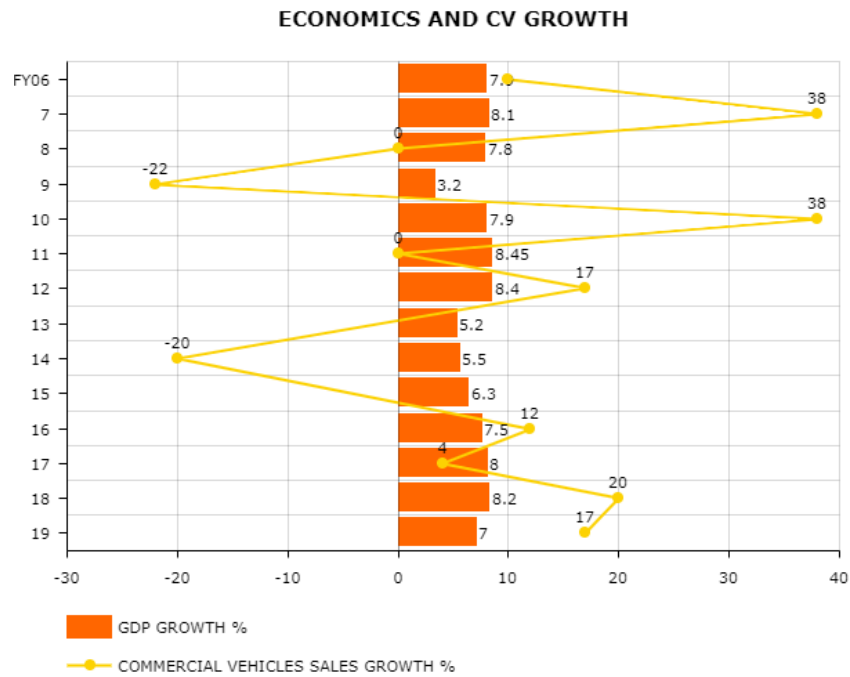


Figure 4: Sales of commercial vehicles have stronger links to GDP growth^{5v}

CONCLUSION:

The results of this study helped us in knowing basic emission standards under the BS VI norms, moving ahead we saw the implementation of BS VI norms while BS IV being discarded and we were able to understand the aftermath of same, i.e., Impact on Indian industries and Indian Economy.

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