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In Depth - BS VI Emission Norms

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According to the United Nations, **9 out of 10 people on the planet are now breathing polluted air**. This has led to a growing global health crisis, **causing about 7 million deaths per year**, as per the World Health Organization (WHO).

- **In India, air pollution is killing one lakh children under the age of five every year and is responsible for 12.5% of all deaths in the country.**
- According to one WHO's measure, India has nine of the world's ten most polluted cities.
- Over the years, the government has taken various **initiatives** to address the issues related to air pollution such as **the National Clean Air Program, the Pradhan Mantri Ujjwala Yojana and the Bharat Stage-VI (BS-VI) emission norms.**

BS-VI Emission Norms

- The Union Environment Minister has recently announced that the BS-VI emission norms will be implemented from the year 2020, and this will drastically reduce vehicular pollution.
- In order to comply with BS-VI norms, the vehicle manufacturers need to move to the new technology to make vehicles compliant with the BS VI standards.
- **The switch to BS-VI vehicles was to happen in 2022 but looking at the poor air condition, the move was advanced by four years.**
- All vehicles will have to follow new standards (BS -VI) from 1st April, 2020. **The standards cover four and two-wheelers and commercial vehicles.**
- **At present, BS IV and BS III fuels are available across India.**
- Due to their use, hazardous pollutants in the air are increasing leading to health ailments like Asthma, Bronchitis, heart diseases and even cancer.

Hero MotoCorp received BS-VI certification

- Hero MotoCorp, the world's largest two-wheeler manufacturer, has become the **first two-wheeler manufacturer in India to receive the BS-VI certification.**
- It received the '**Type Approval**' Certificate from the **International Centre for Automotive Technology (ICAT)** for the Splendor iSmart motorcycle after it was successfully tested for compliance with BS-VI emission norms.

Bharat Stage Emission Standards

- The Bharat Stage (BS) are **emission standards instituted by the Government of India** to regulate the output of air pollutants from motor vehicles.
- **The Environment Ministry is responsible for deciding the fuel standard in the country. The Central Pollution Control Board implements these standards.**
- The BS regulations are **based on the European emission standards.**
- Companies can come up with new vehicles with BS VI fuel standards even before the April 2020 deadline. But after the deadline, vehicles that do not comply with BS VI standards will not be registered.
- With the implementation of new norms, pollution levels are expected to come down significantly as the particulate matter (PM) will decrease. About one-third of the air pollution is caused by cars and motor vehicles.

Advantages of BS-VI fuel Over BS-IV Fuel

- In BS-VI fuel, the volume of PM 2.5 ranges from 20 to 40 micrograms per cubic metre whereas in BS-IV fuel it is up to 120 micrograms per cubic metre.
- **BS-VI fuel will bring down sulphur content by 5 times from the current BS-IV levels.** It has 10 ppm of sulphur as against 50 ppm in BS-IV.

Sulphur in the fuel contributes to fine particulate matter emissions. High sulphur content in the fuel also leads to corrosion and wear of the automobile engine.

- With BS-VI fuel, for every one kilometre, a car will **emit 80% less particulate matter and nearly 70% less nitrogen oxide.**
- Air pollutants in BS-VI fuel are much less as compared to BS-IV fuel.
- BS-VI norms also seek to reduce the level of certain harmful hydrocarbons in the emissions that are produced due to incomplete combustion of fuel.

Shift from BS-IV to BS-VI Norms

- The shift from BS-IV to BS-VI compliant vehicles, in less than a year's time poses a challenge for India's automotive sector
- This will be the first time that the auto industry will follow a sales bound rather than the production-bound deadline.

In all previous instances, manufacturers were allowed to exhaust their stock of older generation inventory after the onset of new emission standards.
- The refineries have also been undergoing major upgradation to produce BS VI fuel.

Car makers will have to start producing BS VI fuel compliant engines as quickly as possible to avail benefits of the cleaner fuel.
- **The shift makes on-board diagnostics (OBD) mandatory for all automobiles.**

The OBD unit **will be able to identify likely areas of malfunction** by means of fault codes stored on a computer ensuring that sophisticated emission control device which is fitted in a BS-VI vehicle runs at optimum efficiency throughout the life of the vehicle.
- Apart from engine calibration, there will be various **after treatment additions** such as selective catalytic reduction and diesel particulate filters **to meet carbon monoxide, hydrocarbons, nitrous oxide and particulate matter limit** of BS VI norms.
- Migration to BS VI norms necessitates the **use of oxygen sensors**, a complex coding of the electronic control unit and ignition control.
- **The cost of producing BS VI grade fuels will be higher compared to BS IV fuels.**
- The two-wheelers predominantly used **carbureted engines** (air and fuel for internal combustion are mixed in the proper air-fuel ratio) and they have to now **move to fuel injection engine systems** (an injector is used to introduce the fuel for internal combustion).

So, **the after sales and service network and manpower will need to be upgraded** for the skills and troubleshooting of this new technology.
- **Diesel hydro-treating units** that will ensure the reduction of sulphur concentration to stipulated limits are being created or their capacity is being augmented.
- For meeting gasoline fuel quality, **desulphurisation technologies** along with octane boosting units are being installed.

Impact of the Shift

- Making automobiles BS VI compatible will increase the cost of production for the manufacturing companies which in turn will make the vehicles costlier for the buyers.
 - This includes **making changes to their production line** to turn out BS VI fuel friendly engines that will become mandatory by the year 2020.
 - Some companies may even have to **import engines** and other parts but in the end it will be the car buyer's burden because **vehicles with BS VI engines will cost more than the BS IV vehicle.**
 - Diesel vehicles and economy segment motor cycles will also see a sharp increase in their prices.
- Using a pre BS IV car using BS VI fuel can be detrimental to the engine life. There may be trouble with injection pumps, oil seals and injectors leading to higher wear and tear, consequently higher emissions.
- It is said that by 2020, all vehicles that will be seen on Indian roads would have BS VI engines, however, **the government has not announced any new rule for old vehicles a scrap policy for outdated automobiles.**

Advantages of the Shift

- By reducing toxic substances in the air, BS-VI will help reduce air pollution.
- BS-VI will **reduce NOx drastically**, thus improving air quality.
 - NOx is the primary cause of a lot of health issues, especially respiratory issues.
- The lower sulphur in BS VI will help **reduce harmful exhaust emissions like NO₂, CO, SO₂.**
- Vehicles that have emission control systems will perform even better with BS-VI.
- For old vehicles, BS-VI standards open up an option of retrofitting.
- Oil companies are making significant changes in their oil refining technique. The new standard requires that the use of sulphur in diesel should come down to 10 PPM, whereas according to the BS -II, it was up to 500 PPM. This change will affect the density of diesel oil. The usual density of BS IV fuel diesel ranges from 820 to 845 kg/ cubic metre but now it has to be increased to 860 kg/ cubic metre.
 - **The change in density will help improve the quality of oil as well as help reduce air pollution.**
 - The **Auto Fuel Vision Policy, 2025** in June 2014 had recommended a 75 paise cess to recoup additional investments projected for producing cleaner fuels.

As the problem of air pollution has turned into a global challenge, concerted efforts by all stakeholders are required to deal with this pressing issue.