

Evolution of powertrain in India

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In recent times, global powertrain market is seeing an unprecedented change. Growing concern for environment and energy security along with increasing digitalisation, innovative business models, evolution of technologies and customer expectations are transforming the powertrain technology.

● Powertrain development

Major economies such as the US, China, and Europe have upgraded with new emission technology and have promoted electric vehicles for the regulatory and strategic targets. In India, we are lagging behind globally in terms of lower emission technology and electrification. Electrification is progressing slowly in India due to demand on the charging infrastructure, technology, as well as the cost of the vehicle, since the cost of the EV will be nearly 2.5 to 4 times of the conventional ICE vehicles.

The Government of India has notified the enforcement



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of the new BS-VI emission effective from April 1, 2020 and electrification of vehicles from 2030. These factors drive the automotive sector to see rapid development in new technologies and infrastructure to meet the target.

● Key drivers from BS-VI

In Diesel engines, about 90% of NOx and 50% of PM is reduced. Gasoline vehicles are subjected to reduction of 25% NOx as well as limits are introduced for PM, PN and NMHC from BS-IV to BS-VI. Sulphur concentration of fuel is reduced from 50ppm to 10ppm in both diesel and Gasoline.

● Gasoline vs. diesel

Quality upgrading in fuel results in increased cost of production for both diesel and gasoline. Price gap between the Gasoline and diesel will reduce. Diesel vehicle will be costlier than the gasoline vehicles. Diesel-run vehicles will approximately come down from 48% to 30% over the years and favor of gasoline will hike. The BS-VI technology upgradations will help the gasoline powertrain to meet the global requirements. Going further, a possible transition in powertrain, will shift from ICE to Hydrogen Fuel Cell EV over the years.

● Electrification and Impact

Society of Indian Automotive Manufacturers (SIAM), aims to achieve vehicle sales in the country to be 100 % pure electric (battery electric and fuel cell vehicles) by 2047. By

2030, only 40% of new vehicles will be pure electric.

As of now, ICE and hybrid vehicles will continue to be effective in market till 2030. Battery electric vehicles will be dominant in the market from 2030 onwards and fuel cell electric vehicles may be the future technology. In India, initially electrification will flow effectively among public transport, institutional and commercial vehicles. Passenger cars and two-wheelers will be slowly electrified in comparison with other vehicle segments.

● CO2 emission reduction

Apart from the above factors, from the emission point of view, CO2 reduction also contributes for big shift in powertrain technology, until 100g CO2 /km, a portfolio of ICE, mild-hybrids, and less than 10% electrification can meet targets. In this scenario small improvement on BS-I technology with respect to combustion and after treatment will take place.

Below 100g CO2 /km, a "portfolio game" with equal importance of ICE, PHEVs, and EVs can meet regulations. In this game, start/stop systems will help, but powertrain electrification will be necessary. Below 50g CO2 /km, a portfolio mainly consisting of EVs and PHEVs is required.

ICE engines will be completely replaced by electric vehicles, but more developments are required in electrical and electronic systems like electric motors and high-power electronics with controls and electric network. **ACI**