



Impact of BS-VI and Strategies for 2Ws Development ECT - 2016

By

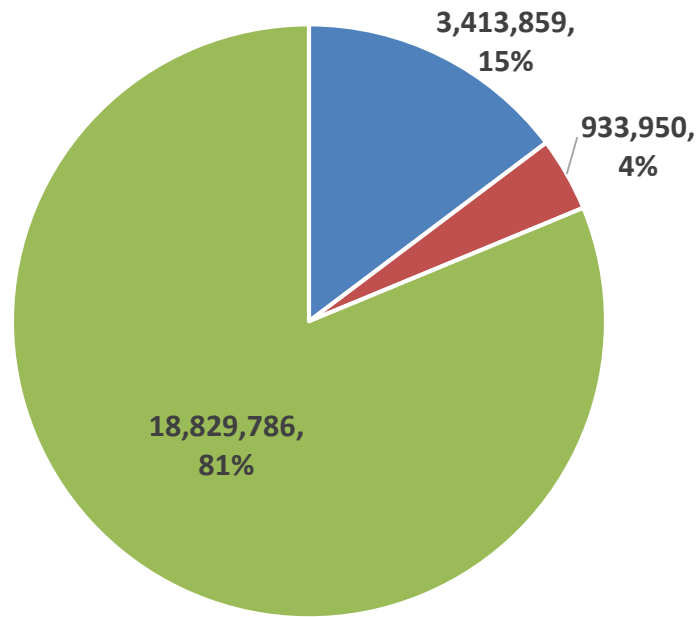
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INDIAN TWO WHEELER MARKET

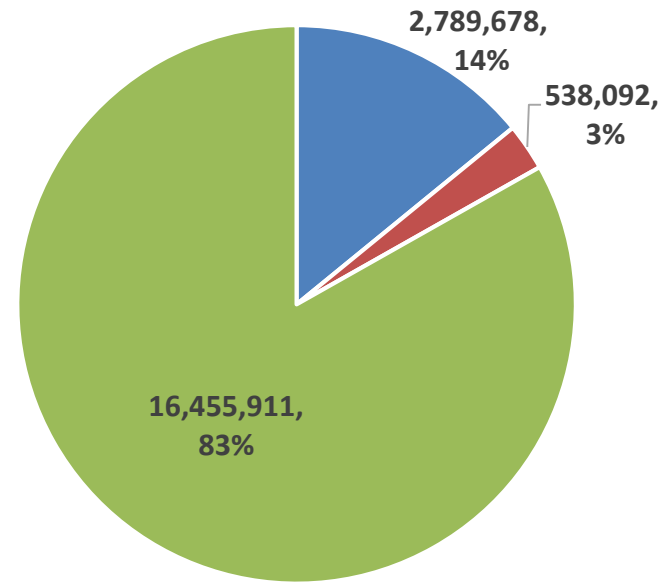
CATEGORIZATION OF PASSENGER VEHICLES



■ Four wheelers ■ Three wheeler ■ Two wheelers

Production (FY 15-16)

*All Figures in Million

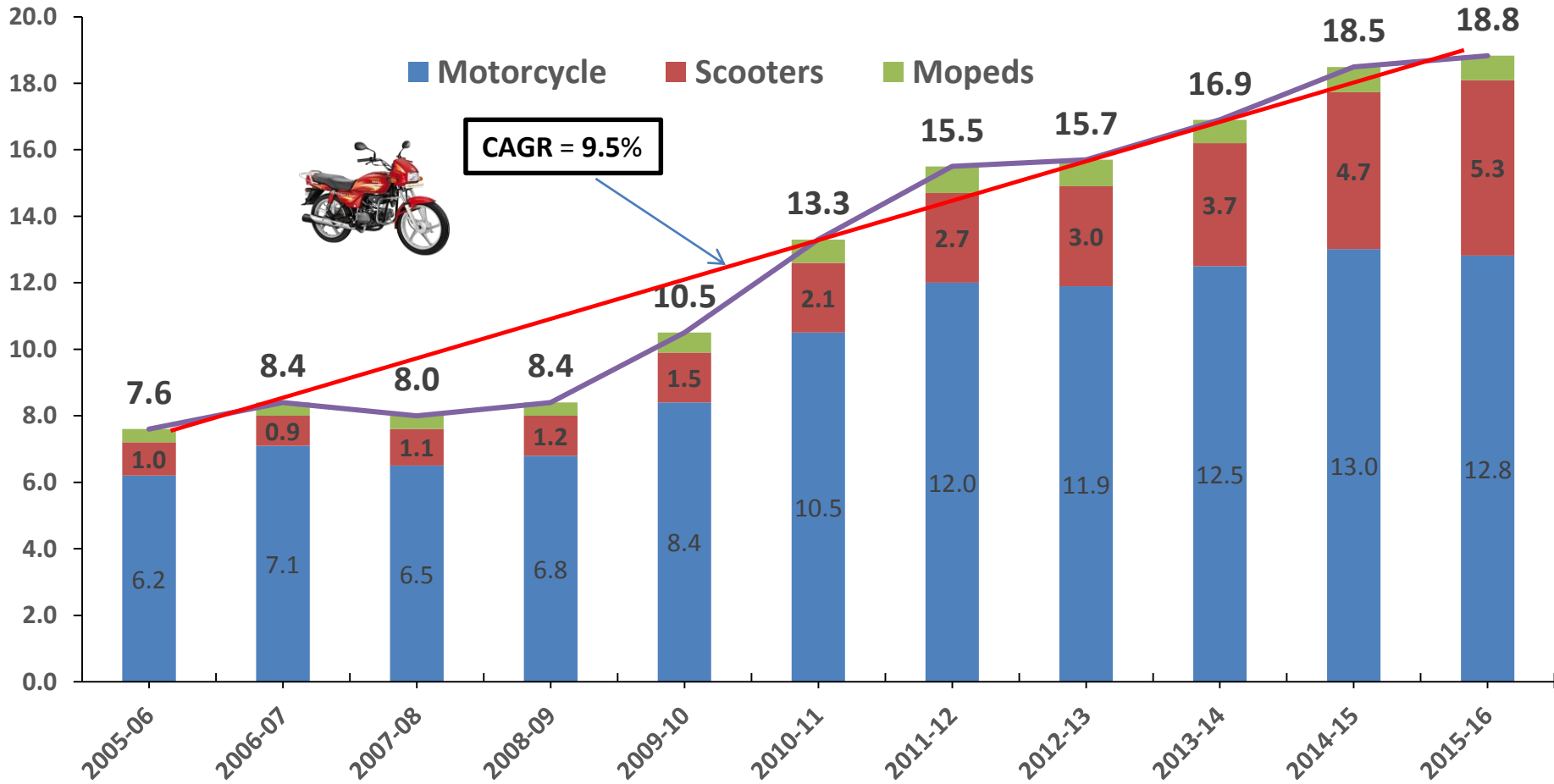


■ Four wheelers ■ Three wheeler ■ Two wheelers

Domestic sales (FY 15-16)

Source: SIAM Statistical Service

VEHICLE PRODUCTION (TWO - WHEELERS)

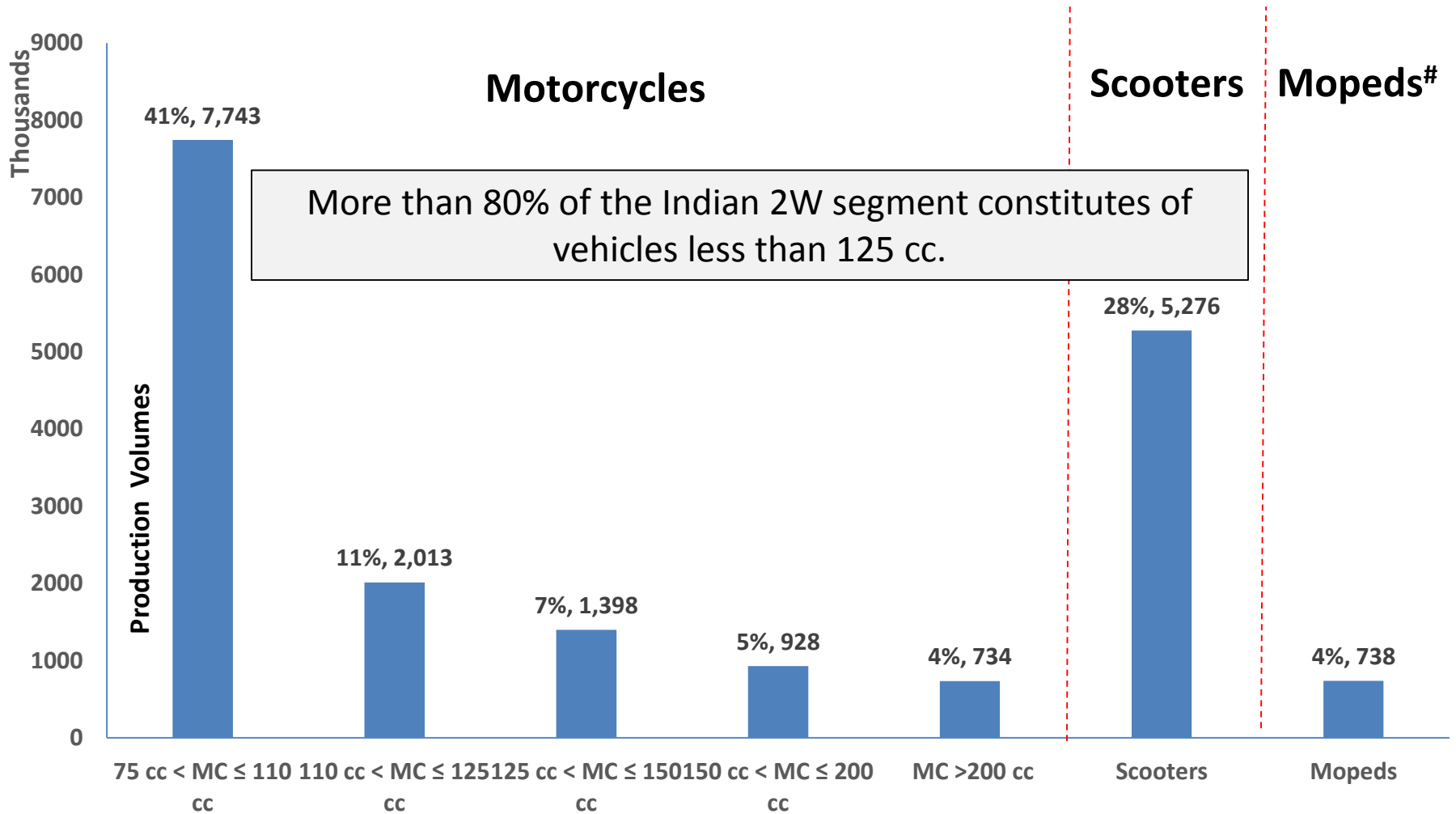


*All Figures in Million

Source: SIAM Statistical Service



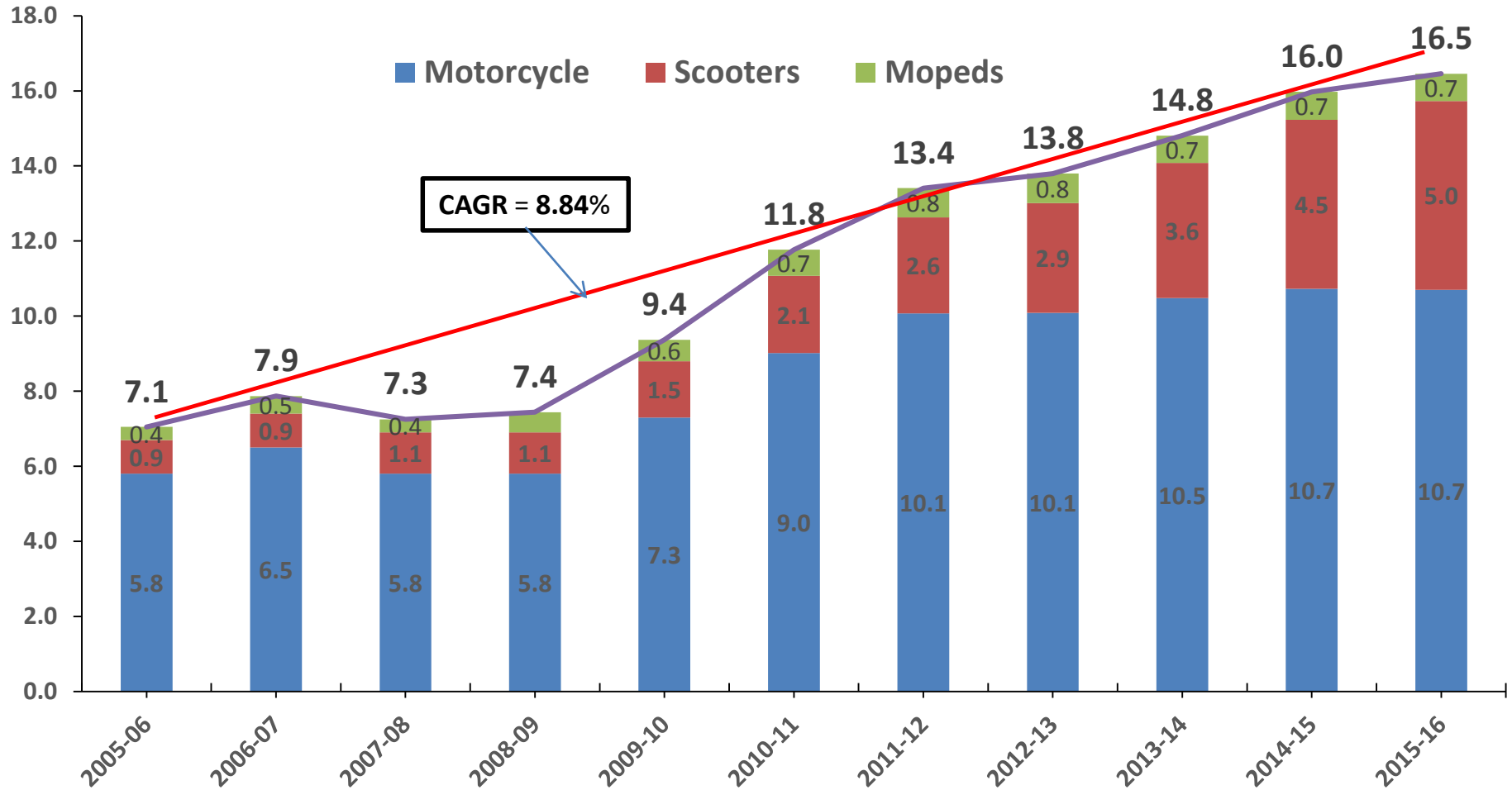
TWO – WHEELERS CATEGORISATION (Prod. Vol.-FY 2015-16)



Vehicle categorisation

*All Figures in Thousands # <75 cc , fixed transmission, big wheel size >12"

DOMESTIC SALES

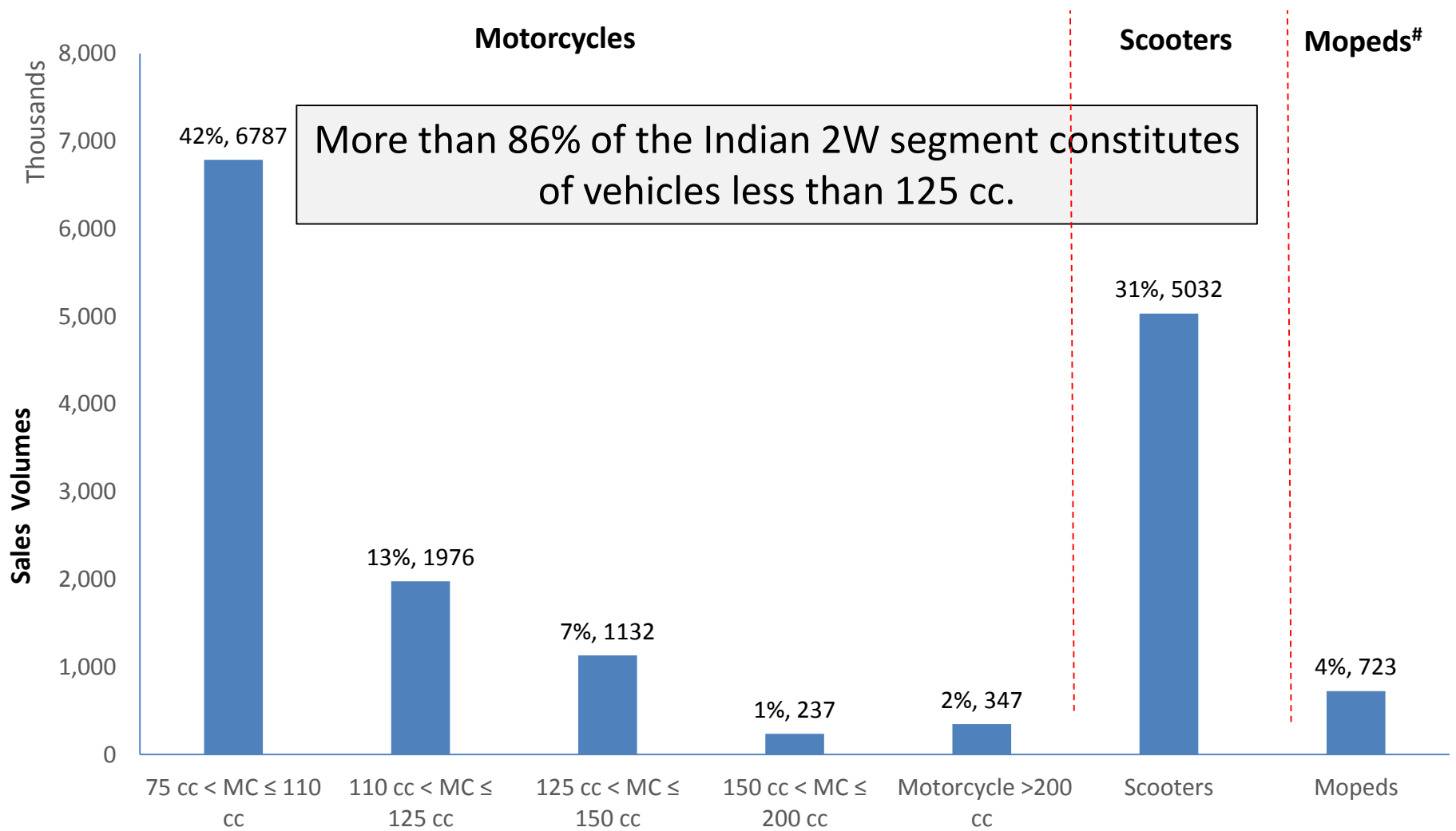


*All Figures in Million

Source: SIAM Statistical Service



TWO – WHEELERS CATEGORISATION (Sales Vol. FY 2015-16)

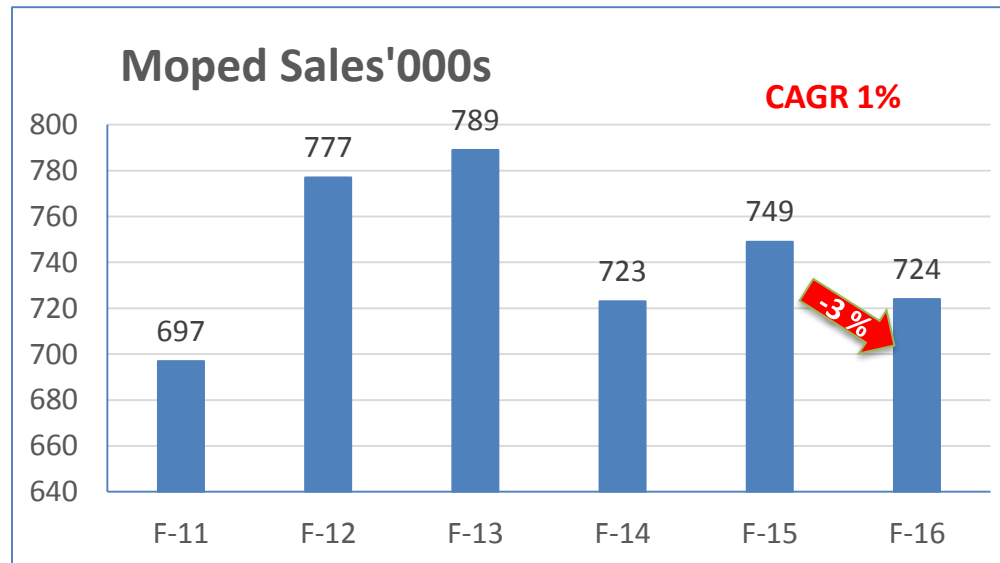
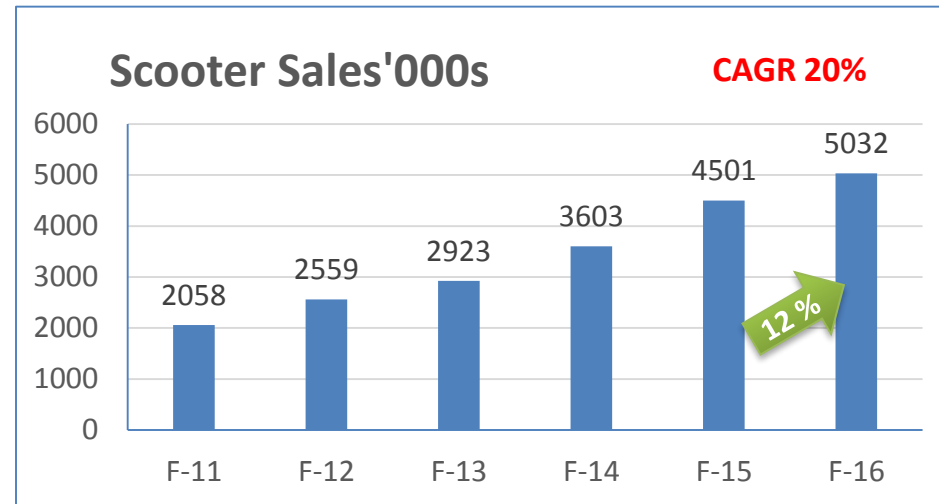
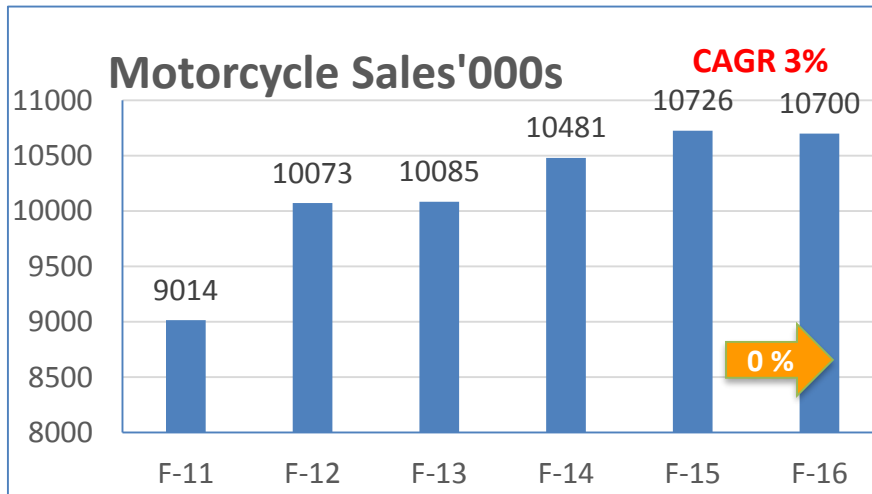


Vehicle categorisation

*All Figures in Thousands

<75 cc , fixed transmission, big wheel size >12"

YEARLY PERFORMANCE OF TWO WHEELERS SUBSEGMENTS



Source: SIAM Statistical Service

SUMMARY

- Two wheeler industry - 81 % of the total passenger vehicle.
- Two wheelers growth over the last decade is CAGR of 9.5 %
- Two Wheeler growth expected to continue primarily because of
 - Low Penetration
 - Poor Public Transport
 - Growing Economy & Infrastructure
- Two wheeler in India are majorly used for daily commuting hence low powered and lower performance and high on Fuel Efficiency.
- Indian Two Wheelers are being exported to many countries
- All major global players are either having manufacturing facility in India or present in Indian market.

Emission Regulations in India

- BS-VI Scenario

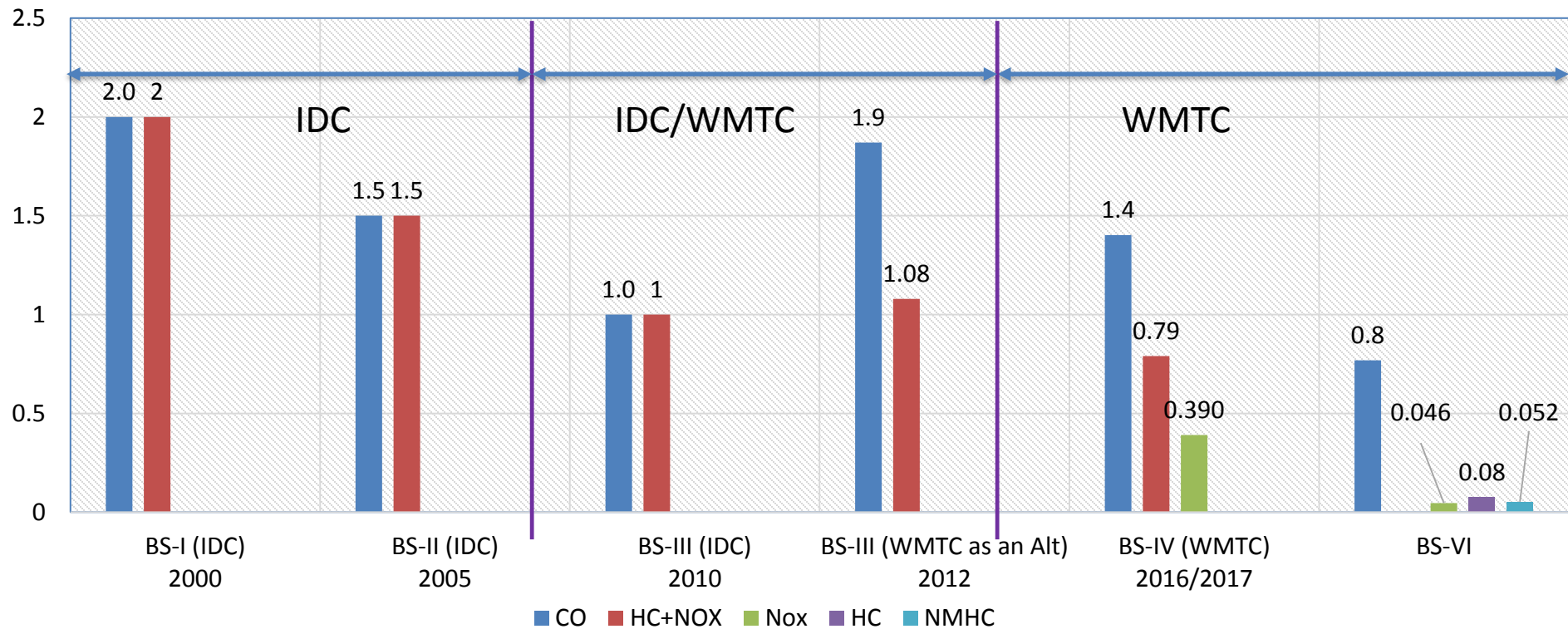
Background for BS-VI

- Today 2W industry is busy in implementing BS-IV all models w e f 1st Apr 2017
- Inline with all other Vehicle Segment , MoRTH has decided to leap frog from BS-IV to BS-VI
- BS-VI has been aligned with EU5 with some changes
- EU5 of 2Ws Pollutants have been aligned with EU6 of 4Ws (except PN)
- BS-VI Final notification has been released GSR-889(E) dt 16th Sep 2016
- Basic difference between EU5 n BS-VI are.....

SN	Parameter	EU5 (168/2013) #	BS-VI (GSR 889(E))
1	Pollutants	-	Aligned with EU5 of 2W
2	OBD1	-Already in EU4	1 st Apr 2020
3	OBD2	1 st Jan 2020	1 st Apr 2023
4	Date	1 st Jan2020(New)	1 st Apr 2020 (All)
		1 st Jan 2021(All)	

EU5-Still not final , European Commission has launched a feasibility Study and would be finalized by Early 2017

India Emission Norm Progression



- Indian 2W emission norms have been progressively tightened every 5 yrs.
- Indian Emission norms are made to keep the high level of fuel efficiency till BS-IV hence...
- Till BS-IV, limits for combined HC + NOx was specified, for retaining superior FE.
- Indian 2 W are used mainly for commuting purposes and hence Fuel Economy is an important factor.

BS-VI (Package) Emission Norm GSR 889(E) dt 16th Sep 2016 (Gasoline)

	CO (mg/km)	HC (mg/km)	NMHC (mg/km)	NOx (mg/km)	PM* (mg/km)	Durability (km)	Evapo (mg/test)
Class1&2	1000	100	68	60	4.5	20,000	1500
Class 3	1000	100	68	60	4.5	35,000	1500
DF	1.3	1.3	1.3	1.3	1	---	300**

Vehicle should equipped with OBD .
 *PM is applicable to gasoline DI engines.
 ** Additive DF

- Proposed date of implementation is 1st April 2020 for all models.
- OBD implemented in two stages.
 - OBD-I, 1st April 2020
 - OBD-II, 1st April 2023 with threshold limits
- IUPR(In use performance ratio) introduced with OBD-II in 2023

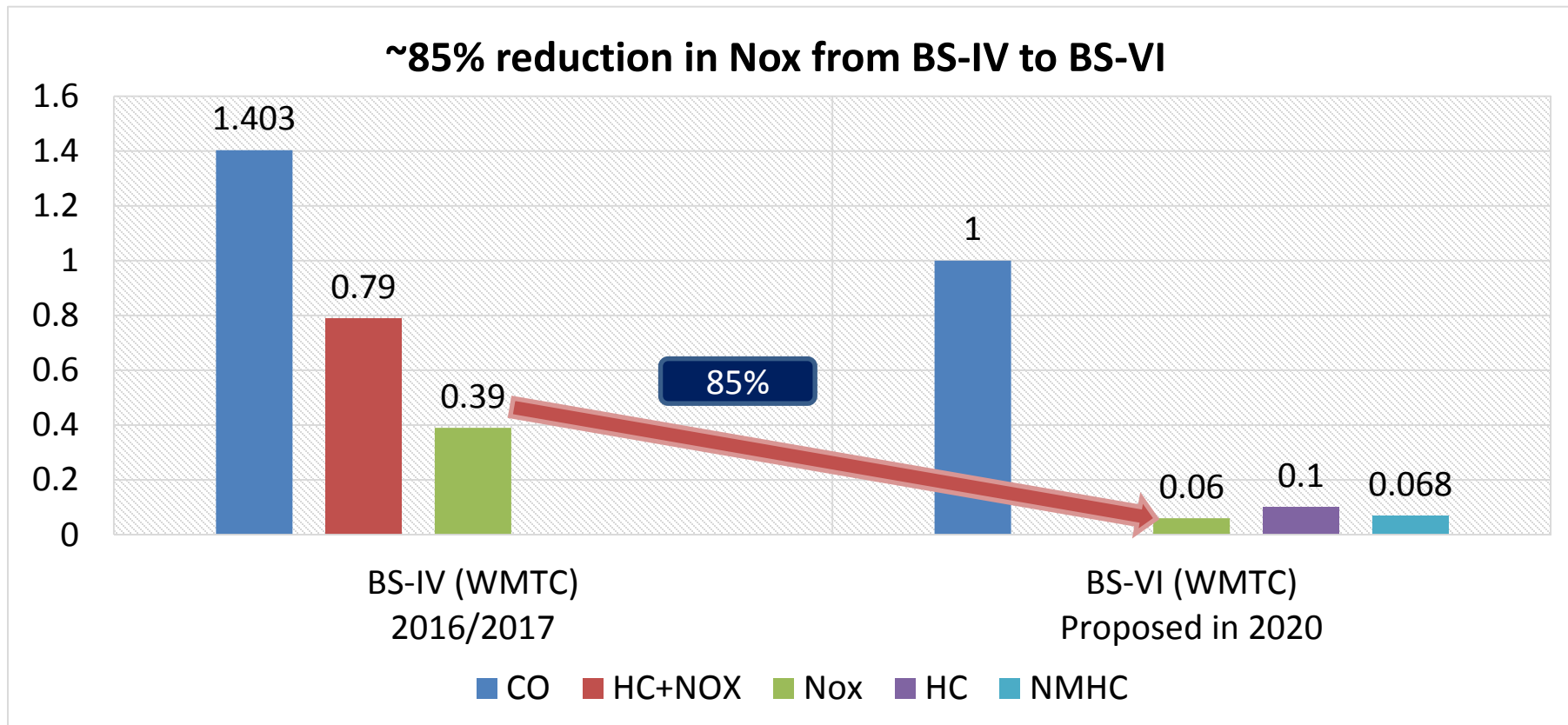
BS-VI (Package) OBD requirements for BS-VI

Monitoring Items	OBD Stage I (BS VI) 1st April, 2020	OBD Stage II (BS VI) 1st April, 2023
Circuit continuity for all emission related power train component (if equipped)	√	√
Distance travelled since MIL(Malfunction indicator lamp) ON	√	√
Electrical disconnection of Electronic evaporative purge control device (if equipped and if active)	√	√
Catalytic converter monitoring	X	√
EGR system monitoring	√	√
Misfire detection	X	√
Oxygen sensor deterioration	X	√

OBD-II Threshold Limit

	CO (mg/km)	NMHC (mg/km)	NOx (mg/km)	PM* (mg/km)
Class 1, 2 and 3	1900	250	300	50

Challenges for BS-VI



- ❑ 3 yrs from BS-IV
- ❑ Due to 85% reduction in NOx, there will be significant loss in fuel efficiency
- ❑ Development of OBD system
- ❑ Implementing one year ahead than Europe

Challenges for BS-VI

1. India is skipping BS-V and leapfrog to BS-VI
2. India is continuously upgrading emission norms after every 5 years while Europe has taken EU3->EU4 , 10 years and EU4->EU5 , 4yrs
3. EU5 has Phasing of New and All models by one year , BS-VI all models in 2020
4. BS-VI aligned with EU5 , which is still not final and based Euro Commission, it will be finalized beginning 2017
5. India is predominantly at Carbureted Engine with 2ways Cat ,where as EU has migrated to FI , hence India's challenge is much bigger.
6. OBD first time on 2Ws
7. Indian 2Ws Engines are lean burn hence most Fuel Efficient in the world , but with BS-VI will have major impact on FE as as NOx is very low , hence Engines have to be calibrated to Stoichiometric ratio.
8. Additional Control on NMHC.
9. BS-VI Gasoline Octane Number continues to be 91 (EU-6 Fuel 95 Octance), hence low handing solution to recover Fuel Economy is not available.
10. Large Volume of 2Ws and all supply chain updation, needs dev time as readymade solution not available even in EU
11. Last Fuel availability is ??

Thank you