

INDIA'S FUEL ECONOMY BENCHMARKS

How to make them work for
an energy-efficient and
climate-secure world

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Taming energy guzzling

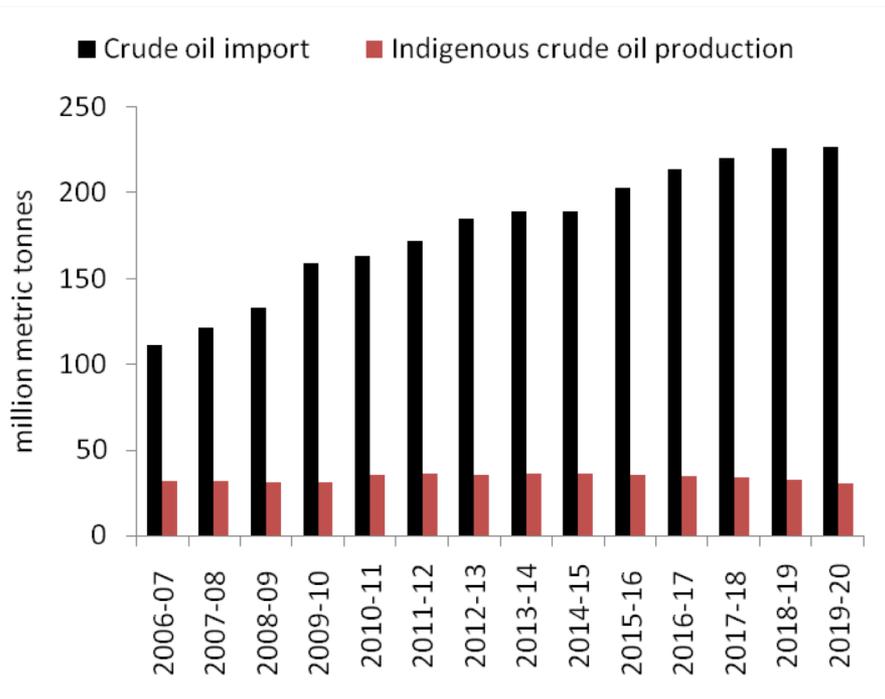


- Energy demand for road transport to more than double over the next two decades
- 300 million more vehicles to be added between now and 2040.
- Oil demand is expected to increase by almost four million barrels per day in 2040—to be the largest increase for any country.
- Over half of the growth to be fuelled by freight transport.
- Road freight activity will triple by 2040.
- Between 2005–06 and 2019–20, petrol and diesel consumption increased by three times and two times.
- Close to 85% of crude oil is imported.
- Oil splurge in the vehicle sector cannot remain untamed.

Energy insecurity

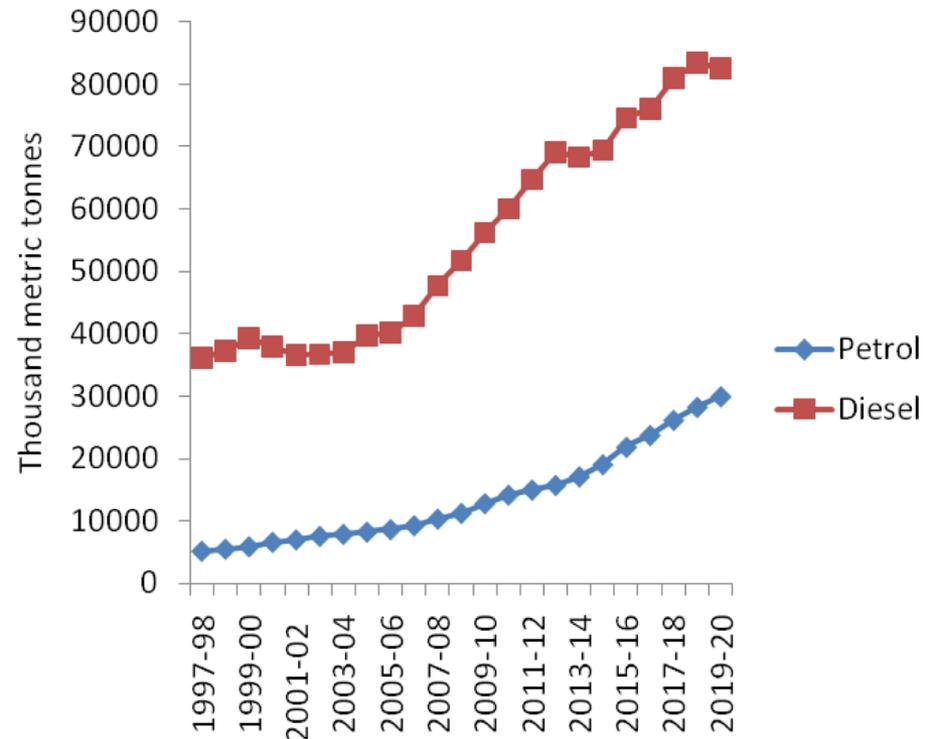


Crude oil: Domestic production and import



Consumption of petrol and diesel

CAGR growth rate of Petrol: 7.76%;
Diesel: 3.24%

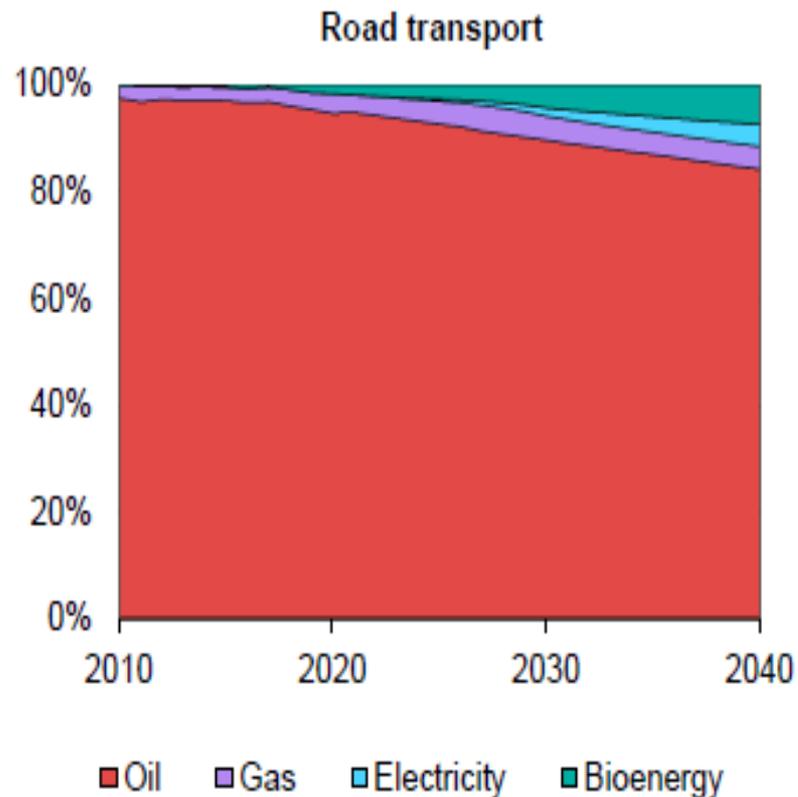
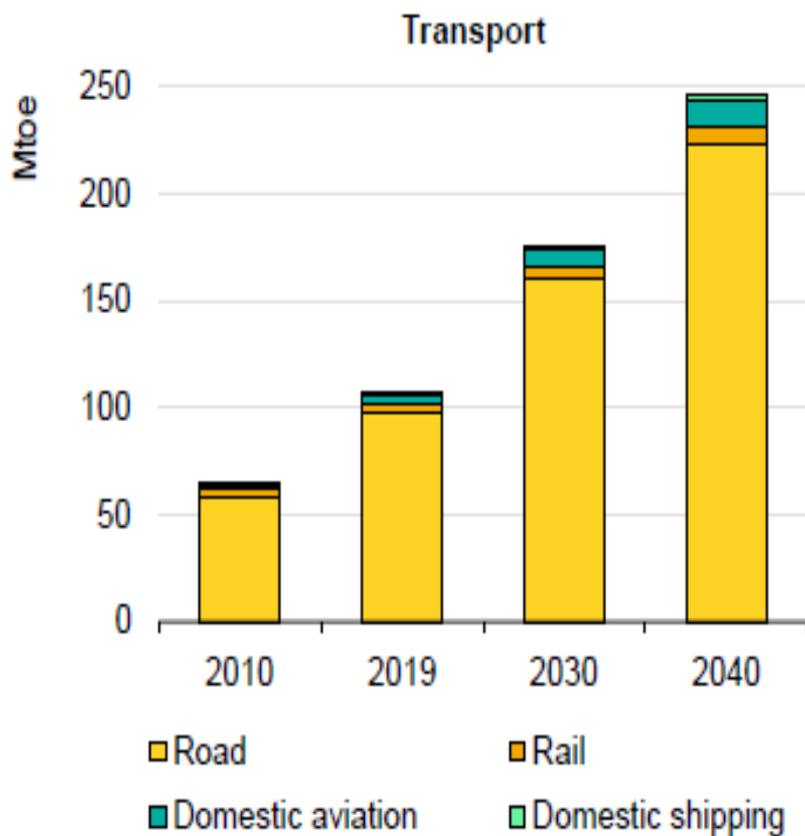


Official target: Reduce dependency on import by 10% by 2021-22

Road transport to upset energy budget in India



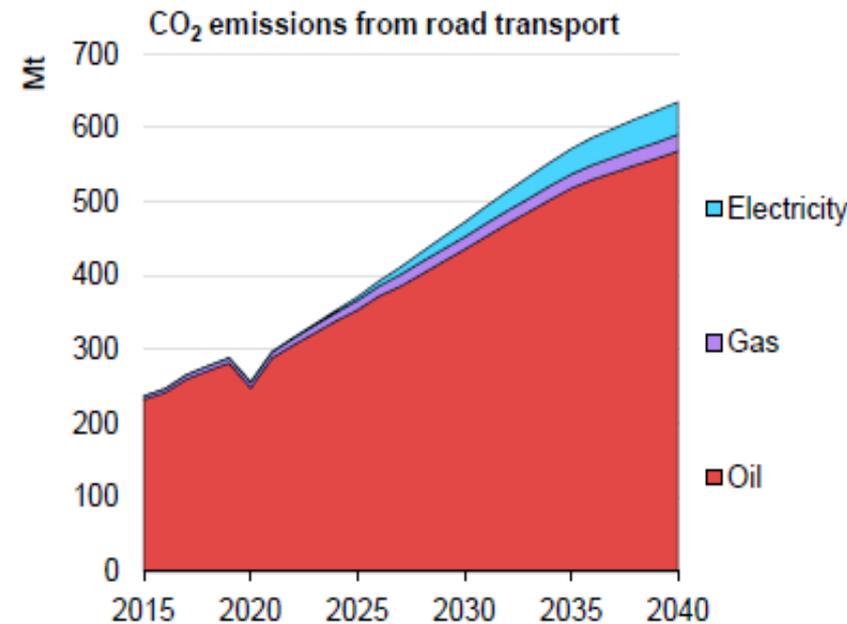
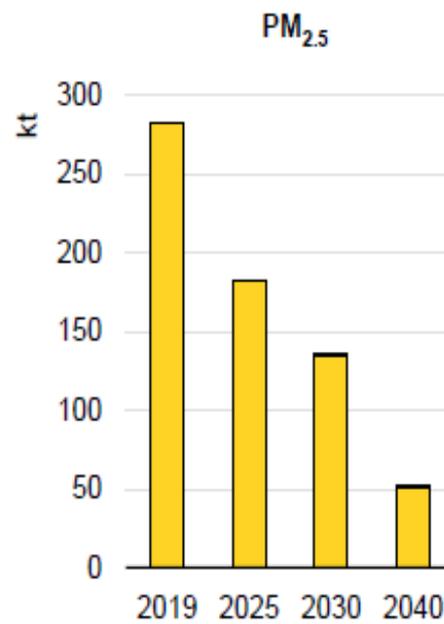
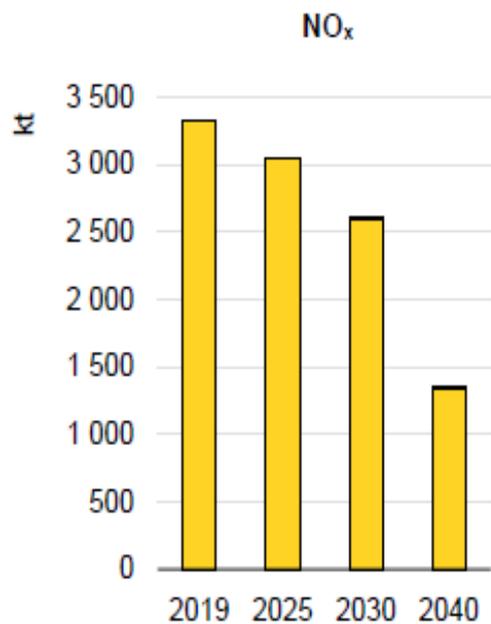
- IEA: India - Final energy use of transport by subsector and road transport by fuel in the Stated Policies Scenario, 2010-2040



Local pollutants to decline but heat trapping CO2 emissions to increase



- Road transport related air pollutant emissions in the Stated Policies Scenario & Road transport related CO2 emissions, 2019-2040



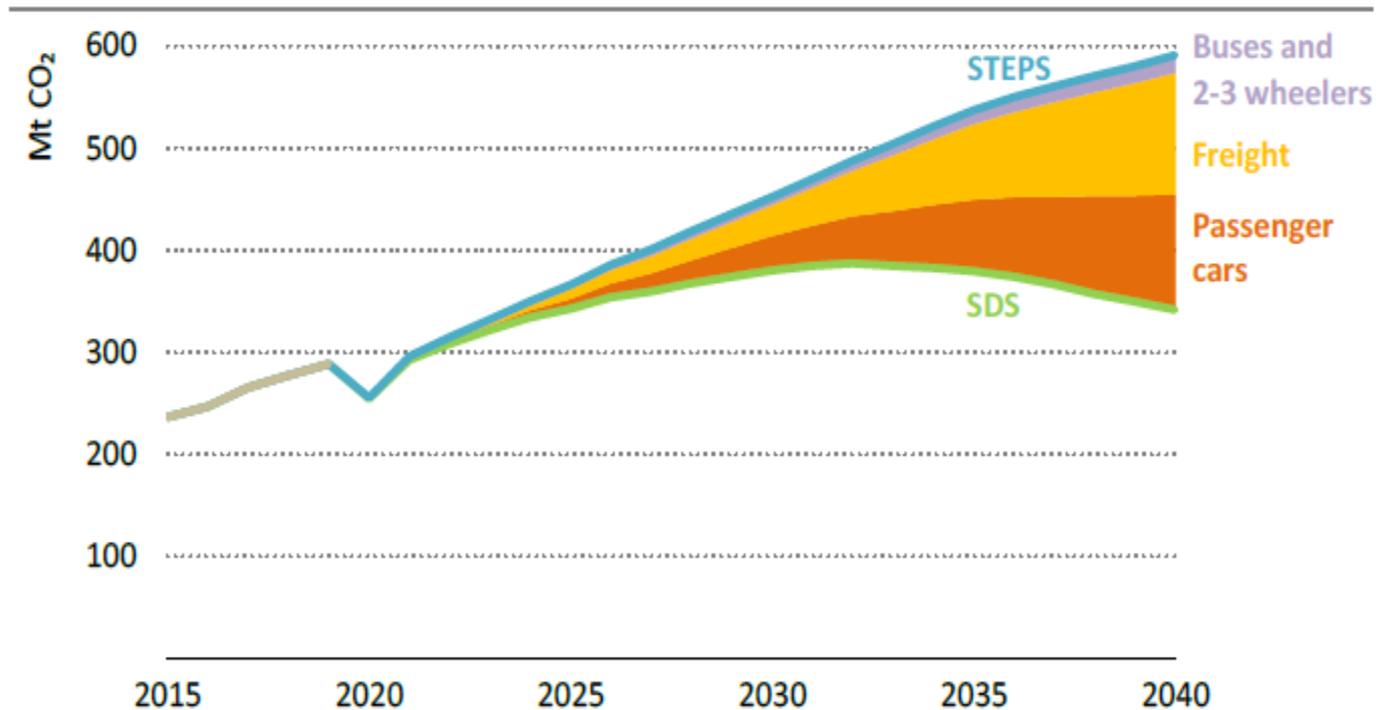
■ Direct emissions (transport sector)

■ Indirect emissions (power sector)



CO₂ reduction opportunities in climate challenged world

- **IEA: India - the biggest opportunity to reduce CO₂ emissions from passenger cars and freight transport**



Note: Scenarios are Stated Policies Scenario (STEPS) and Sustainable Development Scenario (SDS)

Fuel prices: Huge concern over out-of-pocket expense

Strong consumer interest



- **PETROL (Rs/L)**

DELHI **101.84**

MUMBAI **107.83**

CHENNAI **99.47**

KOLKATA **102.08**

- **DIESEL (Rs/L)**

DELHI **89.27**

MUMBAI **96.84**

CHENNAI **93.84**

KOLKATA **92.32**

(as on Aug 21, 2021)

Whither policy to tame fuel guzzling?

Passenger cars.....



First ever Corporate Average Fuel Consumption Norms for Passenger Cars



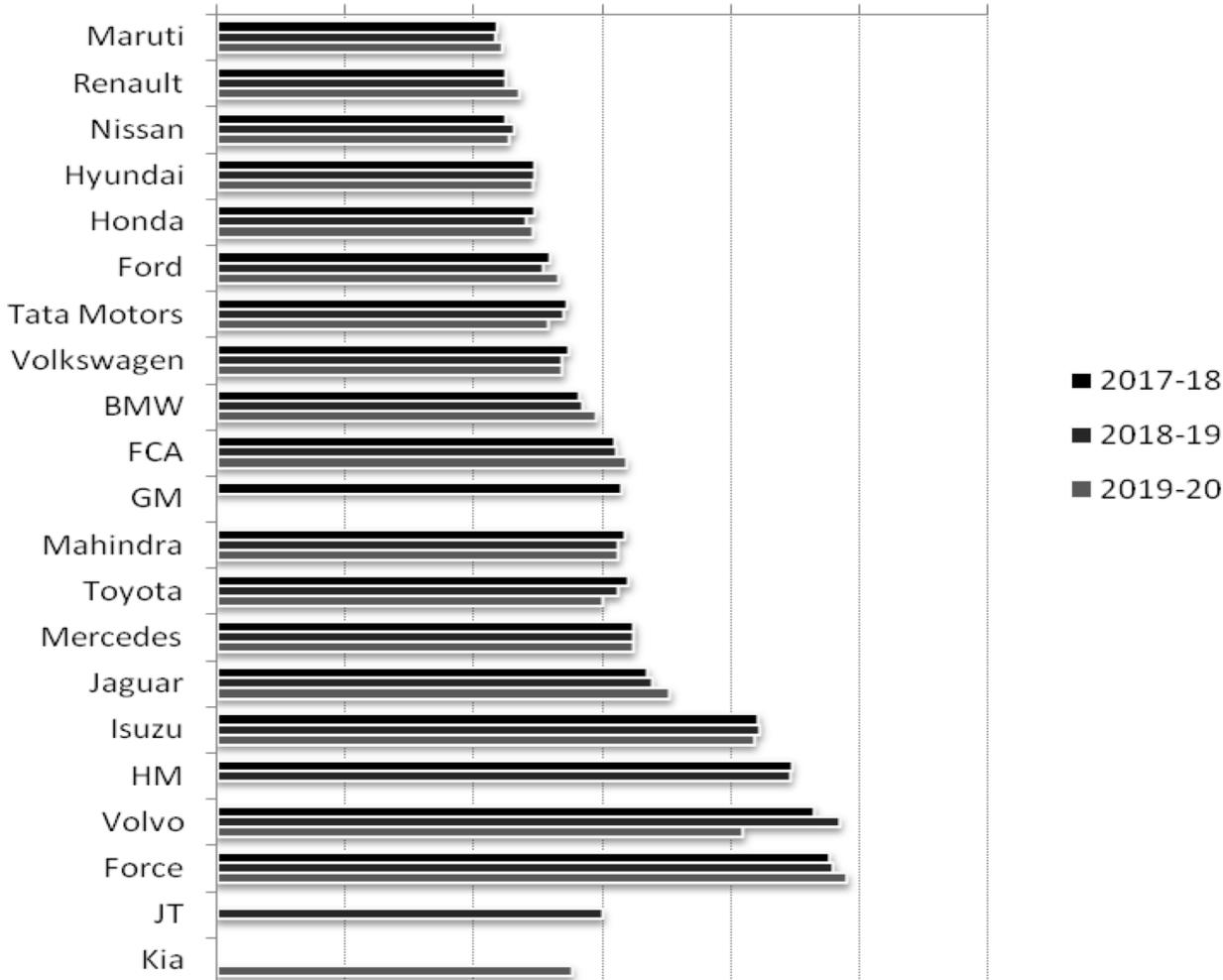
- **Notification on Corporate Average Fuel Consumption (CAFC)** on 23rd April 2015 for passenger cars of Gross Vehicle Weight not exceeding 3,500 kilograms.
- **Stage 1 CAFC standards - 2017-18 onwards:** CAFC Standard to be less than **5.49 L/100 km** for an average weight of 1037 kg or **129.8 CO₂ g/km**.
- **Stage 2 standards from 2022-23** to be less than **4.77 L/100 km** at average weight of 1145 kg (further reduced to 1089kg to reflect market trend); or **113 CO₂ g/km**
- **CAFC compliance -- corporate average fuel consumption** of all vehicles sold by all manufacturers in a fiscal year. ----- Individual car manufacturers have their respective targets depending on the product portfolio



Annual compliance with CAFC (in terms of CO2 emissions - gm/km)

Annual Corporate Average CO2 Performance (in g/km)

0 50 100 150 200 250 300



- Annual performance of manufacturers for 2017-18, 2018-19 and 2019-20 (MORTH):

- All manufactures comply with the current CAFC target

- Performance vary

■ 2017-18
■ 2018-19
■ 2019-20

Need tighter benchmarks



- **Assessment of Stage 1 standards:** Car companies have not only met but also exceeded the 2017–18 requirement of fuel efficiency.
- **IEA evaluation:** Average fuel consumption of new light-duty vehicles sold in 2018 was roughly 9% ahead of the target for that year. Industry has comfortably achieved its target.
- **ICCT evaluation:** The fleet is only 7% away from meeting the next target in 2023. Only a small improvement is needed to meet the Stage 2 standard in 2022–23, especially after the weigh adjustment
- Targets are not very ambitious in the first place.

Compliance and role of super credits



- **For compliance, CAFC norms allow extra points for predefined technology approaches** for their annual calculation of compliance with CAFC standards
 - Parameters like weight, aerodynamics, among others cannot be considered while testing emissions but they influence fuel efficiency.
 - Extra points help to promote innovation and zero emissions.
- **Currently super credits are allowed for:**
 - **i) Electrification:** Battery electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs), and strong hybrid electric vehicles (HEVs) and
 - **ii) Technology approaches:** Regenerative braking, start–stop systems, tire pressure monitoring systems, and six-speed or more transmissions.
- **Link super-credits with transformative technology and electrification.**
Phase out ineffectual credits

Extra points.....



Some credits can weaken the norms: Six-speed transmission, regenerative braking, tyre pressure monitoring (TPM) are common in big luxury brands.

CO ₂ Reducing Technologies	CO ₂ reducing technology derogation factor on CO ₂ emission (c _i)
Regenerative braking	0.98
Start-Stop System	0.98
Tyre pressure monitoring system	0.98
6 or more Speed Transmission	0.98

Incentivise electrification more

S.No.	Vehicle Type	Volume derogation factor for super credit (v _i)
1	Strong Hybrid Electric Vehicles	2.0
2	Plug-in Hybrid Electric Vehicles / Range Extender Hybrid Electric Vehicles	2.5
3	Pure Electric Vehicles	3.0



How to leverage CAFC for accelerating electrification

- **Current CAFC standards can be met with the incremental effort to improve ICE vehicles.**
- **ICCT:-- Only 1–2% electrification of major carmakers can meet Stage 2 targets easily without any significant changes in the ICE technology. Tighter targets would have required higher levels of electrification.**
- **Europe --** Despite having heavier vehicles, compared to low-powered smaller cars of India—Europe has set CO₂ standards at 95 CO₂ g/km in 2020–21, as opposed to 113 CO₂ g/km in India in 2022-23. The average weight of the car fleet in Europe is about 1,400kg—higher than 1086 kg in India. Europe aiming for 60 CO₂ g/km for cars in 2030, - close to most Indian two-wheelers -- 10% Evs in new sales
- **India --** IEA -- India's annual improvement through norms is even lower than the 2.1 per cent annual reductions it achieved during 2006 to 2017 – a period of 12 years. Average weight has also reduced largely due to lowering of sale of diesel cars

Tighten test procedure to reduce gap with real world performance



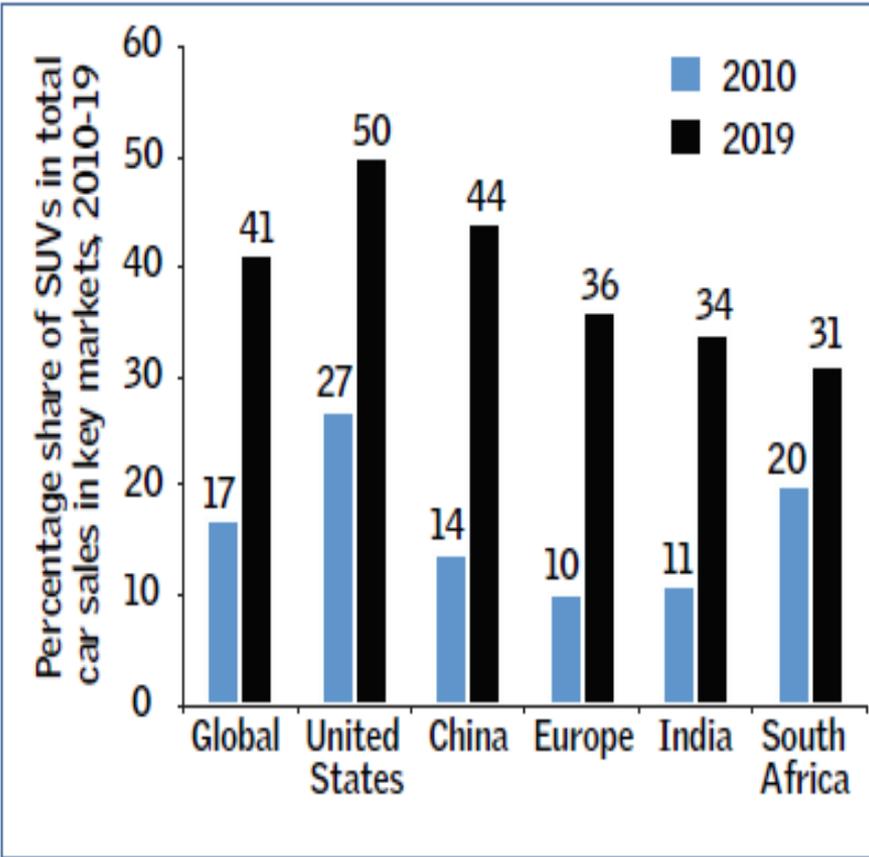
- **Improve testing method for vehicle certification** – (adopt Worldwide Harmonized Light Vehicle Test Procedure (WLTP) based on the new driving cycles (Worldwide Harmonized Light-duty Vehicles Test Cycles or WLTC) for cars -- **for delivery of real world fuel efficiency performance.**
- Already proposed – but mandate and adopt not later than April 2023.
- **Strong consumer interest in real world performance:** Consumers will be more sensitive to on-road emissions and fuel efficiency performance of IC engines and real world driving range of electric vehicles.

Future challenge – trend towards heavier vehicles

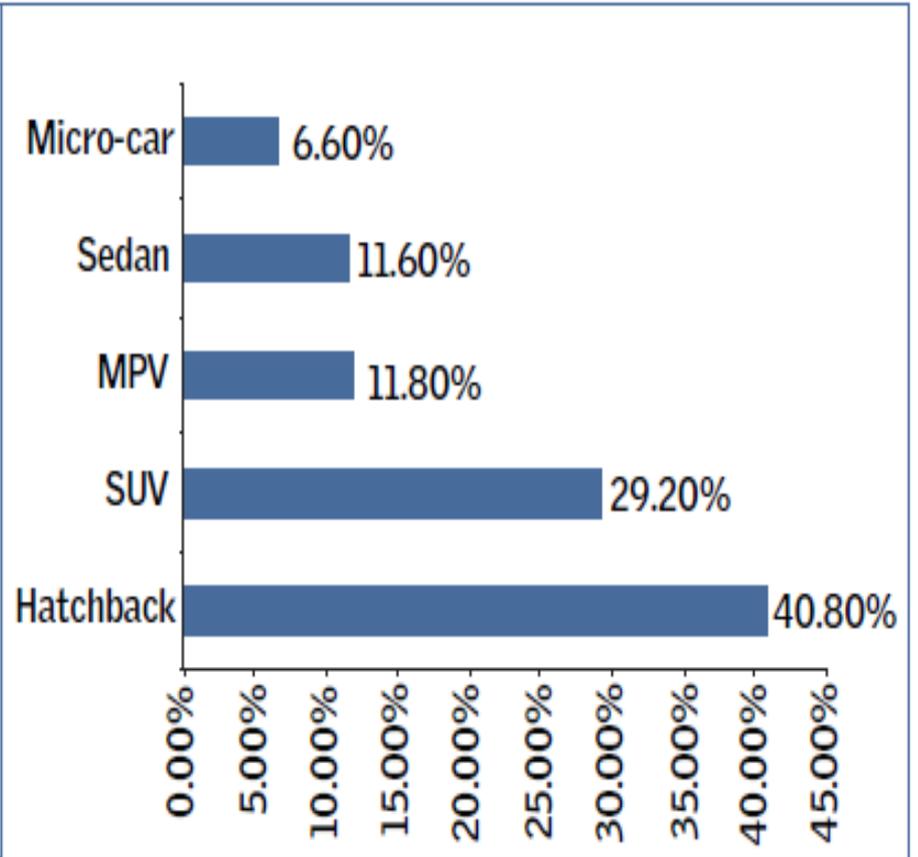
Share of SUVs increasing



(a) Share of SUVs in total car sales in key markets, 2010–19



(b) Share of different category of passenger vehicles in calendar year 2020

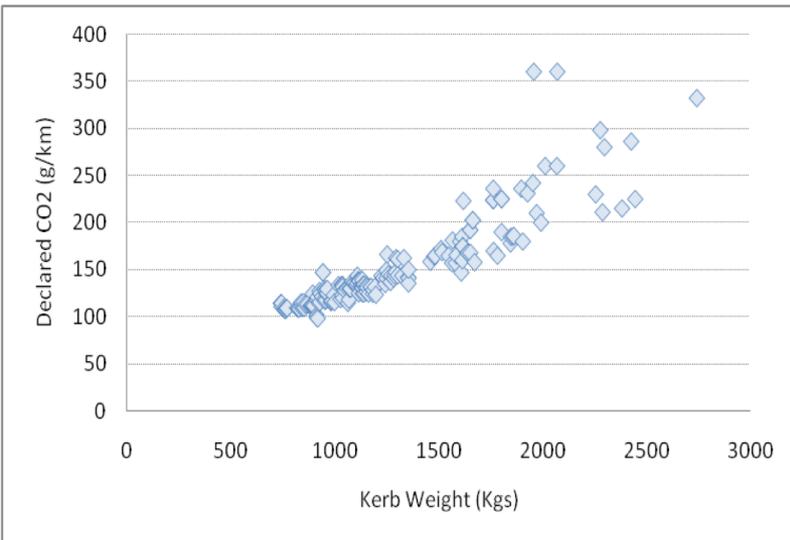


Source: Market sources

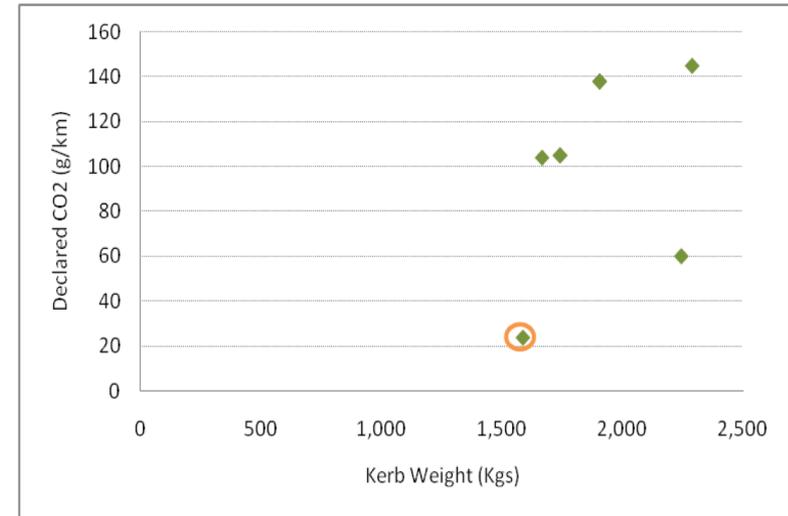
Passenger cars: CO2 emissions from BSVI vehicles



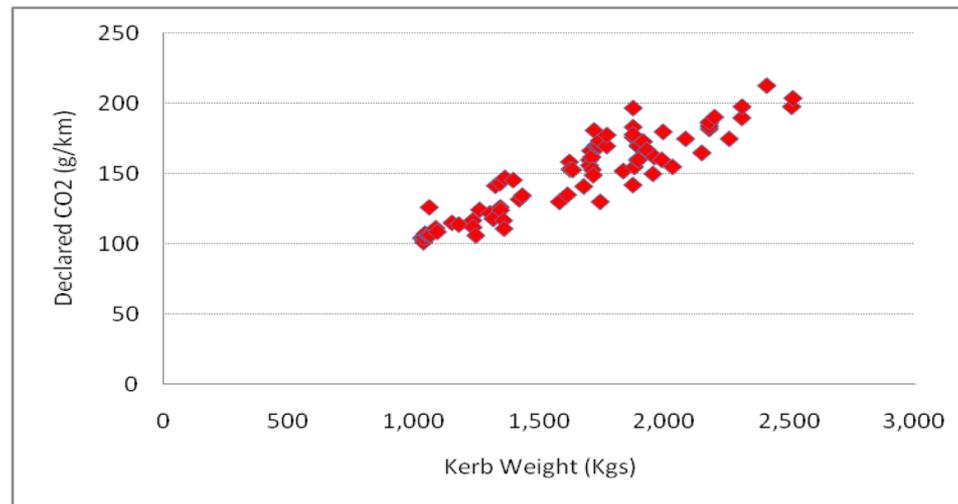
Petrol



Petrol hybrid

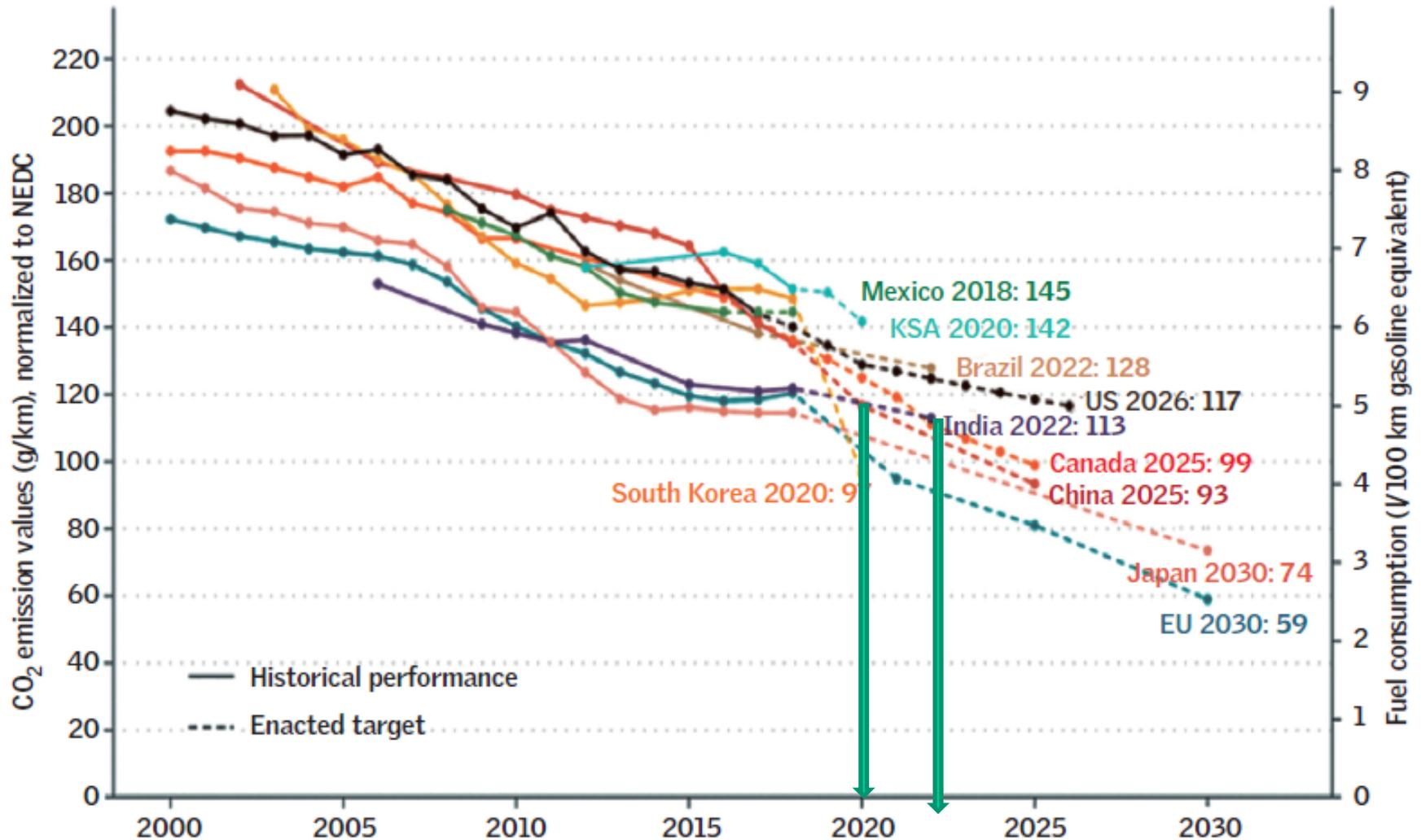


Diesel



Source: Based on SIAM FE data

Where is India in the race?



CAFC standards have strong fuel and carbon saving potential – leverage this



- BEE estimates: CAFC standards can reduce 22.97 million tonnes of fuel consumption by 2025.
- BEE -- CAFC has led to a higher energy and CO₂ savings than the FAME-I incentive scheme for electric vehicles in 2018–19.
 - CAFC has reduced 0.848 million tonnes of oil equivalent (MTOE) as compared to the FAME-1 scheme reduction of 0.038 MTOE.
 - Corresponds to emissions reduction from CAFC - by 2.650 million tonne carbon dioxide (MtCO₂), as opposed to 0.070 MtCO₂ by FAME-1.8
- If CAFC norms can be further tightened, they have the potential to induce faster fleet-wide changes.

Heavy duty vehicles



Heavy duty vehicles: Hesitant steps



- **Phase 1** fuel efficiency norms for HDVs (Gross Vehicle Weight of 12 tonnes and above under S.O. No. 2670(E) -- to be implemented from 1st April, 2018 onwards meeting BS-IV emission norms
- **Phase 2** scheduled from 1st April 2021.
- **Per vehicle standard** –Notification of August 2017: Standard for HDVs (N3 category) weighing over 12 tonnes -- 2.76-6.82 km per litre; Maximum fuel consumption of passenger vehicles with nine or more seats (under M3 category) -- 4.22-5.82 km per litre.
- CSFC test procedure -- vehicle tested over constant speed of 40 and 60 kilometres kph; buses at 50 kph.
- Ministry of Road Transport and Highways has revised the safe axle weight limits.
- **Further modified after BSVI introduction and now re-notified for implementation from April 2021 onwards**
- **Fuel Economy Norms for Light & Commercial Vehicles** between 3.5 and 12 tonnes: Notified on 16th July 2019

Heavy duty vehicles: Uncertainty



Corporate average approach?

**Interest in computer-based simulation tool
(like VECTO in EU)? ----- But complex with
limited global application**

What next?

Two wheelers

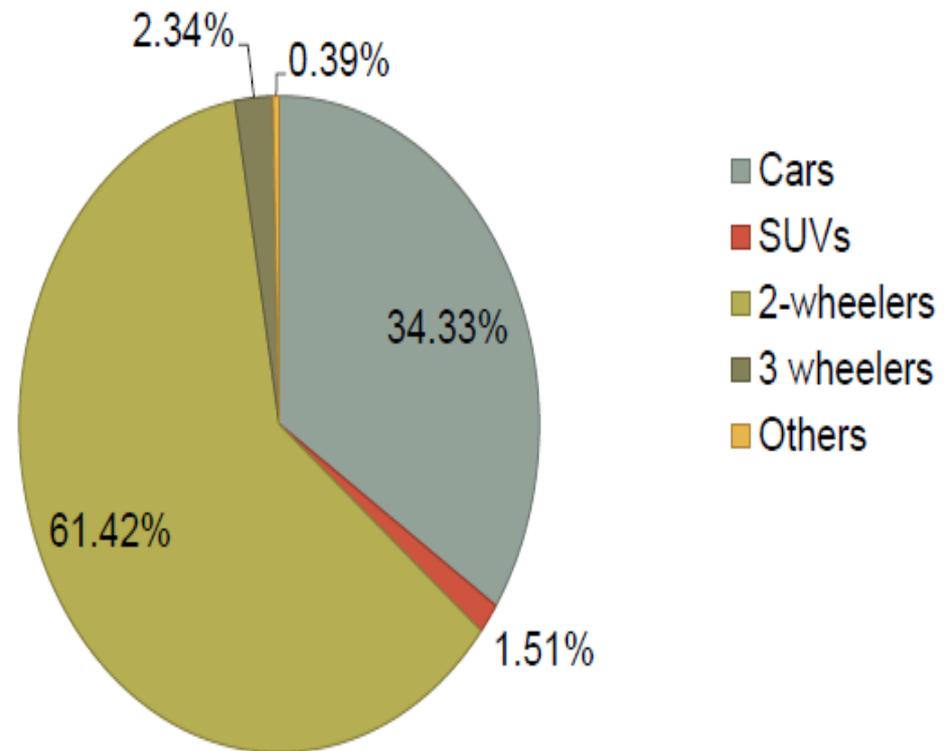


Source: IBTimes

Two wheelers: Consume maximum petrol

Graph: Sector-Wise Share of Petrol-2012-13

- Among all motorized vehicles two-wheelers have the smallest engines and energy footprint.
- But these vehicles are numerous and dominate the vehicle fleet.

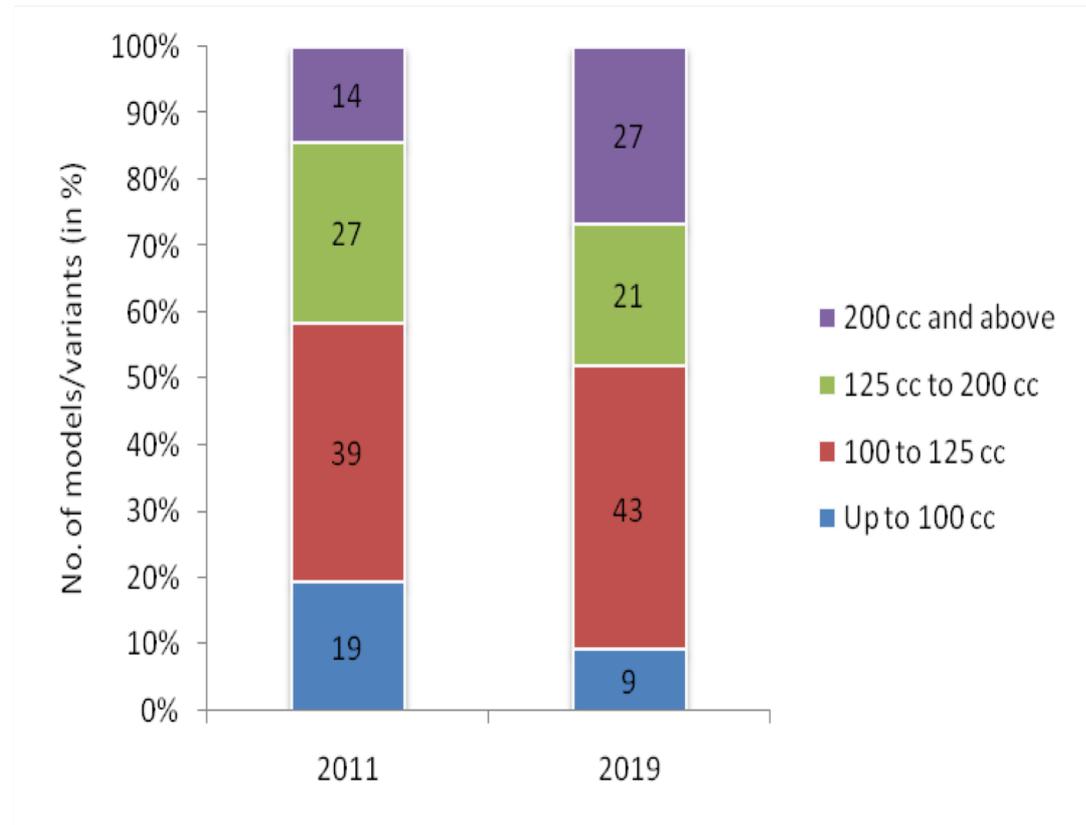


Two wheelers: Market shifting towards heavier models



- Market is gradually shifting towards newer models that have larger engine size and capacity, high power and torque.
- Considerable energy saving is possible with fuel efficiency norms.
- Need standards

Shift towards higher cc classes



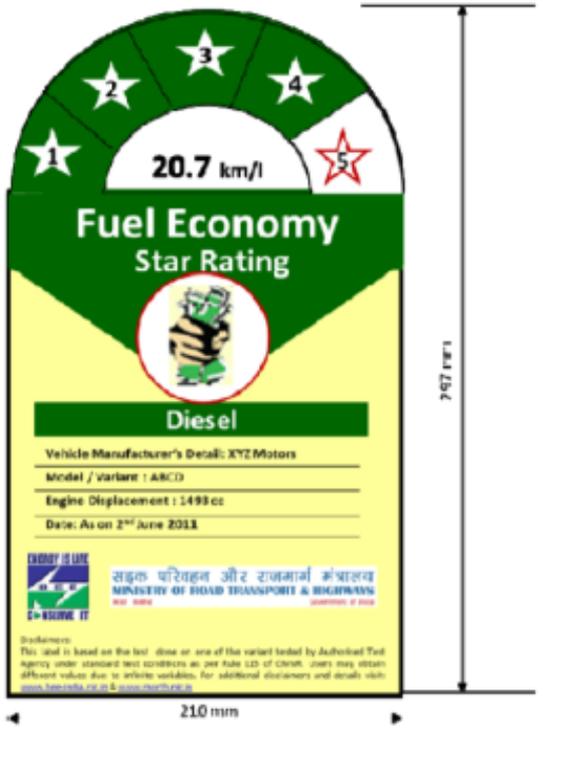
Source: Based on SIAM FE data

Consumer information



Source: Cars 24

Need transparent consumer information system to catalyse market



- **Star labelling:** 2016, MoRTH notified the Fuel Efficiency Norms vide notification no. G.S.R. 17(E), **wherein, the Fuel Economy Star Label was introduced. As per this notification,**
 - Passenger vehicles not exceeding 3,500 kg manufactured after 1st April 2016 must have the Fuel Economy Star Rating (FESR) label
 - Labels must be displayed at point of sale
 - If vehicles are powered with more than one fuel, wherein one is CNG or LPG; FESR label will be that of CNG or LPG as applicable
- Consumers largely depend on advertised fuel economy values, market reports etc
- **SIAM's voluntary disclosure** -- Voluntary Fuel Economy Information Brochure

Random CSE survey of car dealers brochure/information material



Model Name	Fuel Economy Information in Brochure
Tata Altroz/ Tata Tiago / Tata Tigor	Not Available
Ford Ecosport	Yes (For both diesel and petrol variant, manual and automatic transmission mode)
Ford Aspire	Yes (For both petrol and diesel variant)
Hyundai i20 / Aura/ Creta/ Elantra/ Verna/ Grand i10	Not Available
Nissan Kicks Turbo	Mentions “improved” fuel economy; does not provide exact values
Nissan Magnite	Yes, for all variants
Maruti Suzuki Swift	Yes (Mentions Rule 115 (G) of CMVR 1989)
Maruti Suzuki Ertiga	Yes (For both petrol and CNG variant, manual and automatic transmission mode)
Suzuki NexaBaleno	Yes (For both petrol and smart hybrid variant; mentions Rule 115 of CMVR 1989)
Toyota Camry	Mentions “unmatched” fuel efficiency; does not provide exact values
Toyota Glanza	Yes (for both manual, automatic transmission modes and advanced Li ion battery)
Renault Kwid	Not Available in Brochure; mentioned briefly on the website
Skoda Octavia	Yes, as per Worldwide harmonized Light-duty vehicles Test Procedure (WLTP) for low, medium, and high phases
Chevrolet Sail	Yes (for both petrol and diesel variants)
Volkswagen Polo	Yes (mentions Rule 115 of CMVR 1989; also mentions tests done by agency, and actual on road efficiency might vary)
Audi A6 Sedan	Yes (Mentions ARAI certified)
Mahindra XUV 300	Not Available
Mercedes Benz E-Class	Mentions “low fuel consumption”, does not provide exact values
KIA Seltos	Not Available

Source: As of
December
2020

Tap the global learning curve

Transparent consumer information need to be legally binding



Mandate

- **EU directive, 1999/94/EC (as amended by 2003/73/EC):** fuel consumption data for all new passenger vehicles to be made freely available for consumers. While on display at a dealer's showroom, each car model must clearly have the fuel consumption and CO2 emissions displayed
- Mandates all manufacturers to include fuel consumption and CO2 emissions data in all fleet brochures and print advertisements

Incentive schemes

- Schemes for purchase and sale of fuel-efficient vehicles; rebate during registration
- Higher fuel taxes for less fuel-efficient vehicles
- “Fee-bates”: Mix of fees and tax rebates

Taxes based on CO2 and NOx emissions and fuel efficiency for consumers

USA: Fuel economy guide



Build strong consumer information



- **Introduce fuel-efficiency labelling programme for vehicles:** Keep it dynamic.
- **Regulators must ensure credibility of labels, monitor compliance**
- **Transparent consumer information:**
 - Prepare fuel economy guide with detailed information about emissions, fuel and monetary savings, comparison with peer brands and front runners, etc. Make common portals. Fuel consumption and emissions data in all promotional and advertising material of a vehicle model.
- **Build consumer trust:** Consumers need to understand the information that a label provides.

Need forward looking pathways



- **Stay on track** to meet the Stage 2 standards for cars in 2022-23
- **Tighten and set the next targets for all vehicle segments for 2026, 2030 and 2035** – give a longer term policy visibility to the industry.
- **Adopt dynamic approach** to reflect changes in the market
- **Make targets ambitious to accelerate electrification**
- **Reform testing methods for certification of cars** to reduce the gap between lab-based and on-road fuel efficiency performance (adopt WLTP not later than April 2023).
- **Design flexibility mechanism effectively** – credits and trading
- **Incentive for early action and front runners** – based on tighter benchmark
- **Resolve standard making for heavy duty segment**
- **Mandate public data disclosure and data on super-credit flexibility mechanisms**
- **Build consumer information system**



Thank You