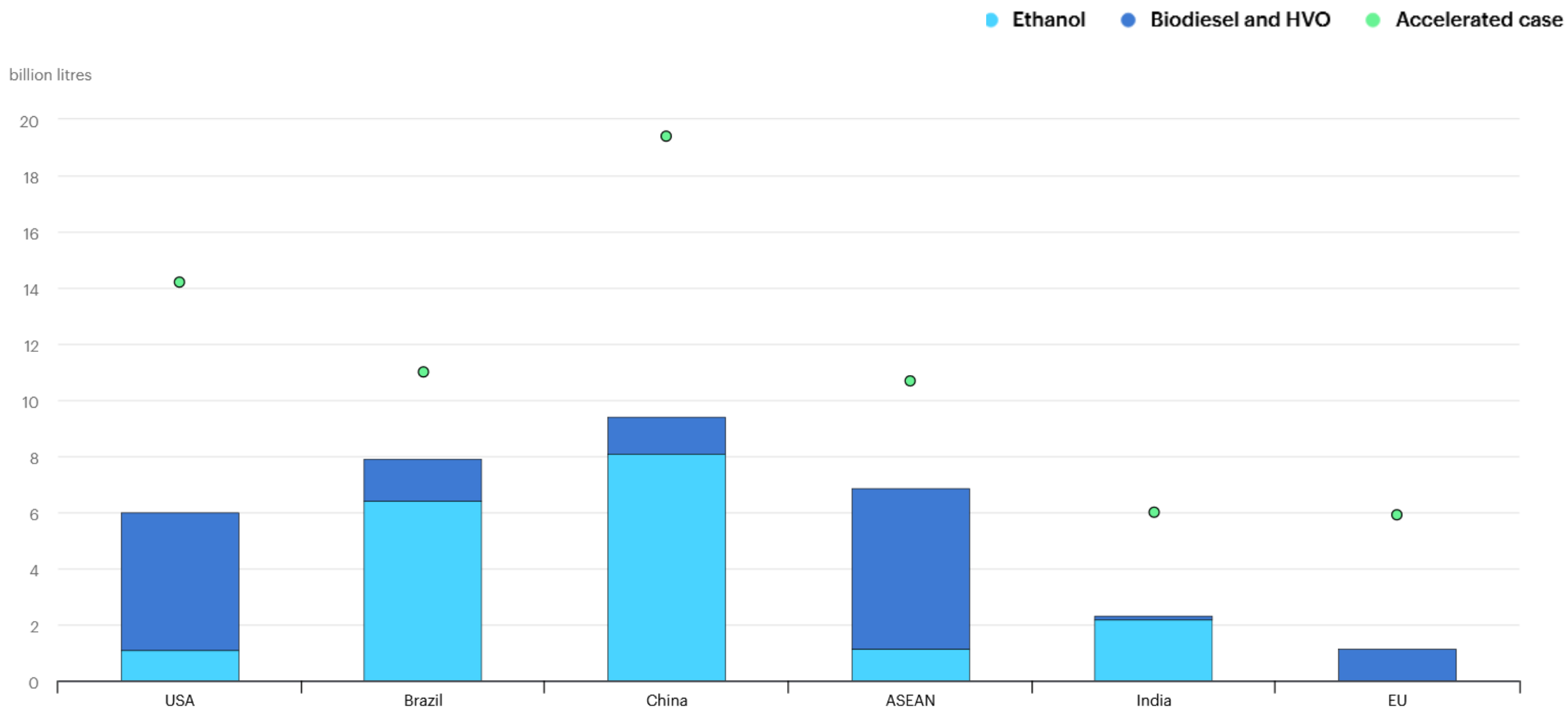


BIO-ETHANOL



Biofuel production growth in key markets, 2019-2024

Primary Drivers for Ethanol Demand as Fuel

- ❑ Demand for ethanol as a fuel is primarily driven by
 - ❑ blending mandates
 - ❑ widespread availability of fuel
 - ❑ compatible vehicles and fulfilment of other infrastructural requirements

Projected additional of Gasoline Vehicles in Future

❑ The current vehicle population in the country is

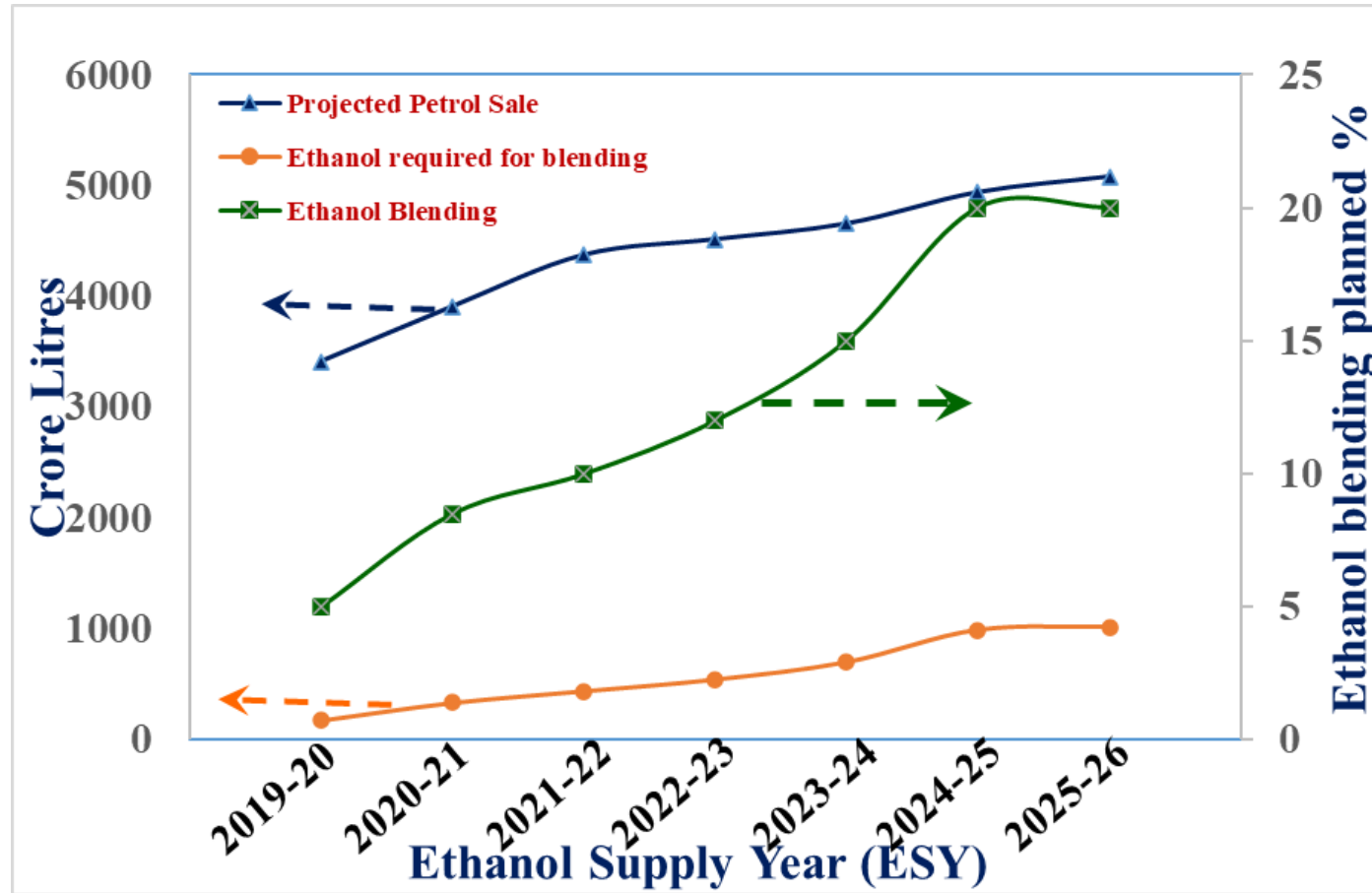
❑ around 22 crore - two and three wheelers

❑ around 3.6 crore - four-wheelers

Units in (lakhs)	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30
Two-wheeler gasoline	174	139	167	181	195	211	227	246	265	287	309
Passenger Vehicle (gasoline)	20	20	22	24	26	28	30	33	35	38	41

Source: Society of Indian Automobile Manufacturers (SIAM)

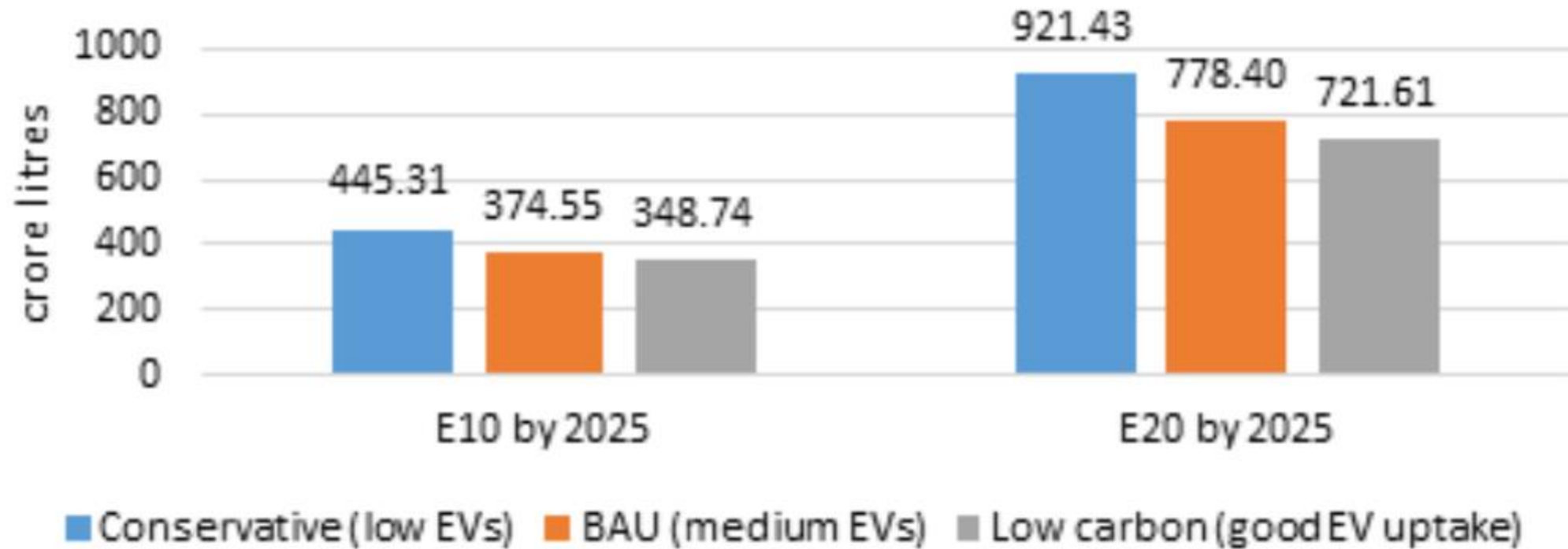
Ethanol Demand Projection to satisfy planned blending



* The petrol projections may undergo revision due various factors like penetration of EVs, etc.

** The figures are optimistic, as the E20 fuel will be consumed by new vehicles from April 2023 only. The demand for ethanol will, however, increase due to penetration of E100 two wheelers, which are now being manufactured in the country.

Ethanol Fuel Demand-Various Scenarios



- ❑ **Conservative (low EVs)** – negligible uptake of electric mobility up to 2030
- ❑ **Business-As-Usual (BAU, medium EVs)** – medium uptake of electric mobility; around 15% of car passenger-kilometres (pkms) and 30% of two-wheeler and three-wheeler pkms are assumed to be electric by 2030
- ❑ **Low Carbon (high EV uptake)** – 30% of car pkms and 80% of two-wheeler and three-wheeler pkms are assumed to be electric by 2030

Ethanol Production Capacity – Major Sources

- ❑ 2017-18, installed capacity of molasses-based distilleries was around 278 crore litres

- ❑ **Molasses-based distilleries**

- ❑ Current capacity: 426 crore litres

- ❑ Expected capacity by 2024-25: 730 crore litres

- ❑ **Grain-based distilleries**

- ❑ current capacity: 258 crore litres

- ❑ 75 crore litres capacity is being added by existing grain-based distilleries

- ❑ 10-15 new grain-based distilleries planned to be added – additional capacity of 100-150 crore litres

- ❑ Expected capacity by 2024-25: 700 crore litres

- ❑ To achieve 10 % blending @ ESY 2021-22: 437 crore litres required

Ethanol Production Capacity – Push from Government

Promotion of production by government

- ❑ interest subvention at the rate of 6% per annum or 50% of rate of interest charged, whichever is lower on the loan sanctioned borne by the central government for a period of 5 years
- ❑ approved 368 projects for setting up of new distilleries / expansion of existing distilleries
- ❑ 31 projects have been completed creating a capacity of 102 crore litres
- ❑ Capacity of molasses-based distilleries has reached to 426 crore litres
- ❑ 39 more projects with capacity of 93 crore litres are likely to be completed by March, 2022
resulting in a cumulative capacities to about 519 crore litres
- ❑ expected that at least 400 Cr litres capacity would be added from these projects by 2024

Ethanol Production – Major Feed-Stocks Availability

(All numbers in Lakh Ton)

Feed-stock	Annual production	Annual Consumption	Surplus
Sugar	320	260	60
FCI rice*	520 (Annual Procurement)	350 (Annual issue)	309# (Stock in central pool)
Maize**	285	165	103##

* FY 2019-20, **as per Market Begin year, # stock in central pool as on 31.03.2020, ##expected after export

Source: Ministry of Petroleum and Natural Gas

Ethanol Additional Production – Major Challenges

- ❑ Availability of sufficient feedstock on a sustainable basis viz., sugarcane, food grains
 - ❑ Current regulations
 - ❑ allow production from sugarcane, sugar, molasses, maize and damaged food-grains unfit for human consumption
 - ❑ Surplus rice with FCI is also allowed
- ❑ Augmentation of ethanol production facilities as planned
- ❑ Inter-state movement of ethanol
- ❑ Weather related issues – floods / drought - affecting the crop
- ❑ Prices of feed-stock and ethanol

Ethanol availability across India – Current Concerns

- ❑ Ethanol is not produced or available in some states for blending with gasoline
- ❑ About 50% of total pump nozzles in India are supplying only E0
- ❑ Restrictions on inter-state movement of ethanol
 - ❑ due to non-implementation of the amended provisions of Industries (Development & Regulation) Act, 1951 by all the States
 - ❑ As on date only 14 states have implemented the amended provisions
 - ❑ Other states with a large consumption of petrol where implementation is pending includes Delhi, Uttar Pradesh, Rajasthan, West Bengal, Telangana, Odisha and Kerala.
- ❑ Ethanol blending has not been taken up in North-East states due to non-availability of feedstock or industries
- ❑ Transport of ethanol to different places for blending will increase the cost of logistics and transport related emissions

Ethanol– Major Concerns for Customers

- ❑ Retaining Fuel Efficiency of Vehicles (Running cost)
- ❑ Portability of vehicles: across the country without any challenge to higher blend availability
- ❑ Supply assurance: Availability of compatible fuels till vehicle end of life.

Ethanol - Remarks

- ❑ Move towards “Advanced Biofuels” including second generation (2G) – to avoid food versus fuel controversy
- ❑ Enhance production capacity to 1500 Cr. Litres by ESY 2025-26 required for E20 blending
- ❑ Quick implementation of policy changes to ensure uniform availability of Ethanol across country