

Ethanol Blending in India: Assessing the Cost Benefit Passed on to Petrol Consumers

Shivani Singh¹, Anil Kumar², Dr. Anil Saxena³

¹Research Scholar, Dept. of Commerce (Account & Law), K.R. P.G. College, Mathura, Dr. B.R. Ambedkar University, Agra (U.P.)

²Assistant Professor, Department of Accounts & Law, Faculty of Commerce, K. R. (P. G.) College, Mathura, Dr. Bhimrao Ambedkar University, Agra, (U.P.)

³Professor and Head, Dept. of Account & Law, Faculty of Commerce, K.R. P.G. College, Mathura, Dr. Bhimrao Ambedkar University, Agra (U.P.)

Abstract

India has increased the use of ethanol in petrol during the period examined here. Blending moved from 10.02% in 2021-22 to 19.24% in 2024-25, and the 20% level was reached during the 2025-26 ethanol supply year. For consumers, this leads to a straightforward question: if more ethanol is blended into petrol, can any related cost advantage actually be seen in the price paid at the pump? To examine this question, the study uses secondary data for 2021-22 to 2025-26 published by the Department of Food and Public Distribution (DFPD), Petroleum Planning and Analysis Cell (PPAC), Indian Oil Corporation Limited (IOCL) and NITI Aayog. The comparison uses selected Delhi petrol price-build-up figures. Dealer price, central excise duty, dealer commission, VAT and retail selling price are considered alongside the changes in blending. The figures do not move in the same way in all the periods considered. Between 2023-24 and 2024-25, the dealer price fell by ₹2.10 per litre and the retail price fell by ₹1.95 per litre, giving an observed pass-through of 92.86%. In the next comparison, from 2024-25 to 2025-26, the dealer price again fell, by ₹2.12 per litre, but the retail price remained unchanged because the increases in excise duty and dealer commission together were also ₹2.12 per litre. Overall, the figures do not show that a possible cost advantage from higher ethanol use necessarily appears as an equal reduction in the consumer price. The final amount paid at the retail outlet is also affected by taxes and the other components of the petrol price.

Keywords: Ethanol Blending, E20, Petrol Price, Consumer Benefit, Price Pass-Through, Excise Duty, VAT, India

1. Introduction

In recent years, ethanol blending has become a regular part of India's energy policy. The Ethanol Blended Petrol (EBP) Programme was introduced with several objectives, including reducing dependence on imported petroleum, encouraging the use of domestically produced ethanol and creating a wider market for ethanol from different feedstocks. The programme expanded over these years. DFPD data show that blending rose from 10.02% in 2021-22 to 12.06% in 2022-23, 14.60% in 2023-24 and 19.24% in 2024-25. The 20% level was reached during the 2025-26 ethanol supply year (DFPD, 2026). The expansion has largely been discussed in terms of energy security, import dependence, agricultural demand and domestic

biofuel capacity. There is also a consumer-side issue that deserves attention: when ethanol replaces a portion of petrol, is any related cost advantage reflected in the price paid at the pump?

Comparing the two fuel prices directly is not sufficient to work out the saving, if any, received by consumers. Ethanol contains less energy than petrol. NITI Aayog's roadmap indicates that about 1.48 litres of ethanol provide an energy equivalent to one litre of petrol (NITI Aayog, 2021). For that reason, comparing one litre of ethanol with one litre of petrol does not give a reliable measure of the possible saving. The amount finally paid by a consumer is also made up of several price components. PPAC price-build-up statements separately identify the dealer price, central excise duty, dealer commission, VAT and the retail selling price. As a result, a reduction in the dealer-level price can be reduced or even cancelled out by changes in taxes and other price components. The analysis therefore follows the movement from the dealer level to the final consumer price during the period in which ethanol blending was increasing. This does not mean that changes in the dealer price are caused only by blending. Crude oil prices, refining and marketing expenses, exchange-rate movements and other market factors can also change petrol prices. The exercise is therefore limited to seeing how much of a recorded dealer-price change is visible in the consumer price after the other components are taken into account.

2. Review of Literature

Research on ethanol blending in India has looked at the subject from several angles, including policy, economics and supply. Ray et al. (2012) examined India's ethanol blending policy, including the reasons for increasing ethanol use and the challenges associated with it. Kumar (2021) discussed the economic dimensions of the blending programme and the role of policy support and broader economic conditions. Saini and Hussain (2023) examined the availability of feedstock needed to meet the E20 target, highlighting an important supply-side issue. Kumar et al. (2024) used a system dynamics approach to examine environmental, economic and policy aspects of ethanol fuel blending. NITI Aayog (2021) discussed the move towards E20 along with energy content, vehicle compatibility and other implications of higher blending. For the present study, the NITI Aayog report is particularly relevant because it shows why ethanol and petrol should not be compared simply on a litre-for-litre basis.

The literature therefore covers issues such as policy, production, feedstock availability, energy security and the economic feasibility of blending. What is less visible in this literature is the question of how a dealer-level price change reaches the consumer after taxes and the other price components are included. This study focuses on that consumer-price transmission aspect.

3. Objectives of the Study

1. To examine the cost-side implications associated with increasing ethanol blending in petrol in India during 2021-22 to 2025-26.
2. To examine whether the observed change in the dealer-level petrol price is reflected in the retail price paid by consumers after considering taxes and other price components.

4. Research Methodology

The study is based on secondary data covering 2021-22 to 2025-26. Information on ethanol blending was obtained from the Department of Food and Public Distribution (DFPD), while petrol price-build-up figures were taken from the Petroleum Planning and Analysis Cell (PPAC) and official disclosures of oil marketing companies, particularly Indian Oil Corporation Limited (IOCL). NITI Aayog was used for

information on the relative energy content of ethanol and petrol. Delhi was selected for the price-build-up analysis because official PPAC and oil marketing company publications provide component-wise information for the city. The analysis considers dealer price, central excise duty, dealer commission, VAT and retail selling price.

The price relationship used in the analysis is:

$$\text{Retail Selling Price} = \text{Price Charged to Dealers} + \text{Excise Duty} + \text{Dealer Commission} + \text{VAT}$$

The change in the main components is calculated as:

$$\text{Change in Dealer Price} = \text{Later Dealer Price} - \text{Earlier Dealer Price}$$

$$\text{Change in Retail Price} = \text{Later Retail Price} - \text{Earlier Retail Price}$$

Where both dealer and retail prices decline, the proportion of the dealer-price reduction reflected in the retail price is calculated as:

$$\text{Observed Pass-through (\%)} = \text{Retail Price Reduction} / \text{Dealer Price Reduction} \times 100$$

The term “observed pass-through” is used deliberately because the available data do not establish that ethanol blending alone caused the change in dealer price. It measures only the share of a recorded dealer-price reduction that appeared in the retail price.

The analysis uses selected official price-build-up observations rather than annual average petrol prices, so the results relate to the particular dates and comparison periods used in the study. Another limitation is that published price-build-up statements do not separately disclose the ethanol-specific cost within blended petrol. For this reason, the study does not assign a particular rupee saving solely to ethanol.

5. Data Analysis and Discussion

5.1 Ethanol Blending During the Study Period

Table 1: Ethanol Blending in Petrol, 2021-22 to 2025-26

Study Year	Ethanol Blending
2021-22	10.02%
2022-23	12.06%
2023-24	14.60%
2024-25	19.24%
2025-26	20.00%

Source: Department of Food and Public Distribution, Government of India.

Blending rose from 10.02% in 2021-22 to 19.24% in 2024-25, an increase of 9.22 percentage points. The 20% level was subsequently reached during the 2025-26 ethanol supply year. The DFPD series shows this gradual increase through 2024-25 and provides the background for examining whether the change in fuel composition was accompanied by a similar movement in the retail price.

This increase in blending provides the background for the comparison of dealer-level and retail-level petrol prices.

5.2 Ethanol Cost and the Potential Cost Effect

The cost of ethanol is not uniform because it varies with the feedstock and procurement arrangement. It would therefore be misleading to take one assumed ethanol price, multiply it by the blending percentage and treat the result as the actual saving received by consumers. The difference in energy content also matters. NITI Aayog (2021) reports that around 1.48 litres of ethanol are energy-equivalent to one litre of

petrol. A litre-for-litre comparison therefore cannot by itself measure consumer benefit. The possible cost-side effect of replacing part of petrol with ethanol is therefore kept separate from the retail-price movement actually recorded after taxes and other components are included.

5.3 Petrol Price Build-up during the Study Period

Table 2: Petrol Price Build-up in Delhi — Selected Official Observations

Study Year	Observation Date	Ethanol Blending	Dealer Price (₹/L)	Excise Duty (₹/L)	Dealer Commission (₹/L)	VAT (₹/L)	Retail Price (₹/L)
2021-22	16-Nov-2021	10.02%	48.23	27.90	3.85	23.99	103.97
2022-23	01-Jul-2022	12.06%	57.33	19.90	3.78	15.71	96.72
2023-24	01-Nov-2023	14.60%	57.27	19.90	3.84	15.71	96.72
2024-25	01-Nov-2024	19.24%	55.17	19.90	4.30	15.40	94.77
2025-26	01-Nov-2025	20.00%	53.05	21.90	4.42	15.40	94.77

Source: PPAC Ready Reckoners and official IOCL price-build-up disclosures.

The 16 November 2021 PPAC price build-up records a dealer price of ₹48.23 per litre, excise duty of ₹27.90, dealer commission of ₹3.85 and VAT of ₹23.99, resulting in a retail price of ₹103.97 per litre. The official disclosures for 1 November 2024 and 1 November 2025 provide the corresponding component-wise figures shown in Table 2.

These figures are observations for the stated dates, not annual average petrol prices.

5.4 Change from 2021-22 to 2022-23

Table 3: Change in Petrol Price Components, 2021-22 to 2022-23

Component	2021-22	2022-23	Change
Ethanol blending	10.02%	12.06%	+2.04 pp.
Dealer price	₹48.23	₹57.33	+₹9.10
Excise duty	₹27.90	₹19.90	–₹8.00
Dealer commission	₹3.85	₹3.78	–₹0.07
VAT	₹23.99	₹15.71	–₹8.28
Retail price	₹103.97	₹96.72	–₹7.25

Source: Compiled from PPAC price-build-up data and official IOCL disclosures.

Between the two observations, blending rose by 2.04 percentage points. The dealer price increased by ₹9.10 per litre, yet the retail price fell by ₹7.25 per litre. During the same period, both excise duty and VAT declined substantially. This comparison also shows the effect that changes in taxes can have on the price finally paid by consumers.

5.5 Change from 2022-23 to 2023-24

Table 4: Change in Petrol Price Components, 2022-23 to 2023-24

Component	2022-23	2023-24	Change
Ethanol blending	12.06%	14.60%	+2.54 pp
Dealer price	₹57.33	₹57.27	–₹0.06
Excise duty	₹19.90	₹19.90	Nil
Dealer commission	₹3.78	₹3.84	+₹0.06
VAT	₹15.71	₹15.71	Nil
Retail price	₹96.72	₹96.72	Nil

Source: Compiled from PPAC price-build-up data and official IOCL disclosures.

Blending increased by 2.54 percentage points, while the dealer price fell only slightly, by ₹0.06 per litre. The retail price did not change. The small dealer-level reduction was effectively absorbed by the ₹0.06 increase in dealer commission. So, a fall in the dealer price does not necessarily mean a fall in the retail price.

5.6 Change from 2023-24 to 2024-25

Table 5: Change in Petrol Price Components, 2023-24 to 2024-25

Component	2023-24	2024-25	Change
Ethanol blending	14.60%	19.24%	+4.64 pp
Dealer price	₹57.27	₹55.17	–₹2.10
Excise duty	₹19.90	₹19.90	Nil
Dealer commission	₹3.84	₹4.30	+₹0.46
VAT	₹15.71	₹15.40	–₹0.31
Retail price	₹96.72	₹94.77	–₹1.95

Source: Compiled from PPAC price-build-up data and official IOCL disclosures.

Among the selected comparisons before E20, this period recorded the largest increase in blending. Blending rose by 4.64 percentage points, while the dealer price declined by ₹2.10 per litre and the retail price declined by ₹1.95 per litre.

The observed pass-through is:

$$\text{₹1.95} \div \text{₹2.10} \times 100 = 92.86\%$$

The calculation means that ₹1.95 of the ₹2.10 dealer-price reduction was reflected in the retail price, giving an observed pass-through of 92.86%.

The remaining ₹0.15 per litre can be reconciled with changes in the other components:

$$\text{₹0.00} + \text{₹0.46} - \text{₹0.31} = \text{₹0.15 per litre}$$

Where the three figures represent the changes in excise duty, dealer commission and VAT respectively.

In this case, most of the recorded fall in the dealer price appeared in the consumer price. This result should not, however, be interpreted as evidence that the increase in ethanol blending alone caused the ₹2.10 per litre decline.

5.7 Change from 2024-25 to 2025-26

Table 6: Change in Petrol Price Components, 2024-25 to 2025-26

Component	2024-25	2025-26	Change
Ethanol blending	19.24%	20.00%	+0.76 pp
Dealer price	₹55.17	₹53.05	–₹2.12
Excise duty	₹19.90	₹21.90	+₹2.00
Dealer commission	₹4.30	₹4.42	+₹0.12
VAT	₹15.40	₹15.40	Nil
Retail price	₹94.77	₹94.77	Nil

Source: Compiled from PPAC price-build-up data and official IOCL price-build-up disclosure.

The next comparison gives a different result. From 2024-25 to 2025-26, the dealer price fell by ₹2.12 per litre. At the same time, excise duty increased by ₹2.00 and dealer commission increased by ₹0.12 per litre. Together, these two increases exactly matched the dealer-price reduction.

Dealer price reduction = ₹2.12/L

Increase in excise duty and dealer commission = ₹2.12/L

Net change in retail price = ₹0/L

The retail price consequently remained at ₹94.77 per litre. Thus, in this comparison, the reduction at the dealer level did not translate into a lower retail price.

The 1 November 2025 IOCL price-build-up confirms these figures.

5.8 Overall Change during the Study Period

Table 7: Overall Change in Selected Price Components, 2021-22 to 2025-26

Component	2021-22	2025-26	Change
Ethanol blending	10.02%	20.00%	+9.98 pp
Dealer price	₹48.23	₹53.05	+₹4.82
Excise duty	₹27.90	₹21.90	–₹6.00
Dealer commission	₹3.85	₹4.42	+₹0.57
VAT	₹23.99	₹15.40	–₹8.59
Retail price	₹103.97	₹94.77	–₹9.20

Source: Compiled from the selected official price-build-up observations presented in Table 2.

Across the selected 2021-22 and 2025-26 observations, ethanol blending increased by 9.98 percentage points. Over the same observations, the dealer price was ₹4.82 per litre higher, while the retail price was ₹9.20 lower. The fall in the retail price occurred alongside a ₹6.00 reduction in excise duty and an ₹8.59 reduction in VAT, partly offset by a ₹0.57 increase in dealer commission. The overall change reflects several price components and cannot be assigned to ethanol blending alone.

5.9 Consumer Benefit: Evidence from Price Transmission

The consumer-side effect can be seen by comparing the dealer price with the final retail price. Comparing the two movements helps show whether a reduction at the dealer level was actually reflected in the price paid by consumers during the period of rising ethanol blending.

Table 8: Observed Consumer Price Effect

Comparison	Dealer Price Change	Retail Price Change	Consumer Price Effect
2021-22 → 2022-23	+₹9.10	−₹7.25	Retail price declined
2022-23 → 2023-24	−₹0.06	₹0.00	No retail-price reduction
2023-24 → 2024-25	−₹2.10	−₹1.95	₹1.95/L reduction; 92.86% observed pass-through
2024-25 → 2025-26	−₹2.12	₹0.00	No retail-price reduction

Source: Compiled from Tables 3–6 using the selected official price-build-up observations.

The selected comparisons show different responses at the consumer level. From 2023-24 to 2024-25, most of the recorded fall in the dealer price was visible in the retail price. In the following comparison, the dealer-price reduction was completely offset by increases in excise duty and dealer commission. These observations do not provide a basis for assigning a fixed consumer saving simply from the increase in ethanol blending. The other components of the petrol price therefore remain important in determining what consumers finally pay.

6. Findings

The analysis gives the following findings:

1. Blending increased from 10.02% in 2021-22 to 19.24% in 2024-25 and reached 20% during ESY 2025-26.
2. Ethanol price cannot be treated as direct consumer saving because its energy content is lower than that of petrol.
3. The final retail price reflects the dealer price, excise duty, dealer commission and VAT.
4. Between 2021-22 and 2022-23, the dealer price increased by ₹9.10 per litre, while the retail price declined by ₹7.25 per litre, alongside substantial reductions in excise duty and VAT.
5. Between 2022-23 and 2023-24, the dealer price declined slightly by ₹0.06 per litre, but the retail price remained unchanged.
6. Between 2023-24 and 2024-25, the dealer price declined by ₹2.10 per litre and the retail price declined by ₹1.95 per litre.
7. The 2023-24 to 2024-25 comparison gives an observed pass-through of 92.86%.
8. Between 2024-25 and 2025-26, the dealer price declined by ₹2.12 per litre, but the retail price remained unchanged.
9. The ₹2.12 per litre dealer-price reduction was fully offset by a ₹2.00 increase in excise duty and a ₹0.12 increase in dealer commission.
10. The figures do not show a consistent one-to-one transfer of the potential cost-side benefit from higher blending to consumers.
11. Ethanol blending alone cannot explain the dealer-price movements, since other market and policy factors also affect petrol prices.

7. Conclusion

The central question examined here was whether a possible cost-side advantage from greater ethanol blending was visible in the price paid by petrol consumers during 2021-22 to 2025-26. Ethanol blending increased substantially over the period, from 10.02% in 2021-22 to 20% during ESY 2025-26. This increase cannot, by itself, be converted into a specific consumer saving. Ethanol and petrol differ in energy content, and the retail price also contains taxes and other components. The selected price-build-up figures show that changes at the dealer level were not always followed by a similar change in the retail price. In one comparison, a large part of the dealer-price reduction was reflected in the retail price, whereas in the next comparison the reduction was fully offset by changes in excise duty and dealer commission.

The results also need to be considered in view of the limitations of the available data. The study does not isolate the independent effect of ethanol blending from crude oil prices, refining and marketing expenses, exchange-rate movements and other market or policy factors. It also does not assign a specific rupee saving to ethanol because the published price-build-up statements do not separately identify the ethanol-specific cost within blended petrol. What the study does show is that an increase in blending does not automatically result in an equal reduction in the price paid by consumers. The final consumer outcome depends on the combined movement of the different components that make up the retail price.

References

1. Department of Food and Public Distribution. (2025). Annual Report 2024-25. Ministry of Consumer Affairs, Food and Public Distribution, Government of India.
2. Department of Food and Public Distribution. (2026). Ethanol Blended Petrol Programme. Ministry of Consumer Affairs, Food and Public Distribution, Government of India.
3. Indian Oil Corporation Limited. (2025). Price build-up of petrol at Delhi effective 1 November 2025. Indian Oil Corporation Limited.
4. Kumar, G. (2021). Ethanol blending program in India: An economic assessment. *Energy Sources, Part B: Economics, Planning and Policy*, 16(4), 371–386. <https://doi.org/10.1080/15567249.2021.1923865>
5. Kumar, G., Padhy, R., Das, D., & Narayana, S. A. (2024). Ethanol fuel blending program in India: Analysis of environmental, economic, and policy aspects using system dynamics approach. *Journal of Advanced Transportation*, 2024, Article 2002187. <https://doi.org/10.1155/2024/2002187>
6. NITI Aayog. (2021). Roadmap for Ethanol Blending in India 2020-25. Government of India.
7. Petroleum Planning and Analysis Cell. (2022). Ready Reckoner: Price build-up of petroleum products. Ministry of Petroleum and Natural Gas, Government of India.
8. Petroleum Planning and Analysis Cell. (2024). Ready Reckoner H1 FY 2024-25. Ministry of Petroleum and Natural Gas, Government of India.
9. Petroleum Planning and Analysis Cell. (2026). Central Excise and Customs Rate on Major Petroleum Products. Ministry of Petroleum and Natural Gas, Government of India.
10. Petroleum Planning and Analysis Cell. (2026). Price Build-up and State RSP of Petrol and Diesel. Ministry of Petroleum and Natural Gas, Government of India.
11. Ray, S., Goldar, A., & Miglani, S. (2012). The ethanol blending policy in India. *Economic & Political Weekly*, 47(1).
12. Saini, S., & Hussain, S. (2023). Does India have enough feedstock to meet its E20 fuel-blending targets by 2025? *Agricultural Economics Research Review*, 36(2), 111–122. <https://doi.org/10.5958/0974-0279.2023.00026.5>