

# BLENDING METHANOL IN VEHICLES TOWARDS MINIMIZING AUTOMOTIVE POLLUTION

Dr. Ashok G. Matani<sup>a</sup>, Ashish Mali<sup>b</sup>

<sup>a</sup>Professor, Department of Mechanical Engineering, Government College of Engineering, Amravati, India, Email: [dragmatani@gmail.com](mailto:dragmatani@gmail.com), [ashokgm333@rediffmail.com](mailto:ashokgm333@rediffmail.com)

<sup>b</sup>2<sup>nd</sup> Year M.Tech. [Thermal Engineering], Government College of Engineering, Amravati – 444604 [M.S.] India, E-mail: [ashishmali04@gmail.com](mailto:ashishmali04@gmail.com)

**Abstract:** The worldwide energy policy also aims to reduce greenhouse gas emissions occurred due to traditional fuels and thus developing renewable energy became an important part of this policy. Nowadays transport sector has decreased its reliance on oil which generally contributes to hazardous environmental impact and to achieve this some alternative transport fuels such as biofuels, hydrogen and natural gas emerged up as a helping hand. Adding methanol into diesel or gasoline permits the mixture to possess an entire combustion with the presence of oxygen which increases its combustion efficiency and reduces greenhouse gas emission. This paper discusses significance of methanol as a fuel for IC engines and its applicability in various sectors.

**Keywords:** Alcohol fuel, anhydrous ethanol blends, better fuel vaporization, high energy content, higher blending octane, iso-butanol.

## 1. Introduction

In the past few years, alternative fuels on internal combustion engine (ICE) recently has fetched public attention due to concern for environmental protection, and desires on reducing reliance on fossil fuels and meeting the present rigorous regulation. Alcoholic fuels are one among the alluring alternative fuels as it can be produced from renewable resources and is oxygenated. To produce better engine operation in spark ignition engine, methanol fuel is a popular substitute alcoholic fuel which could be blended at lower blending ratio with gasoline. However, there are some problems considering the properties of methanol, particularly the characteristic like vapour lock and its content of energy. Alcoholic fuels having higher carbon molecules like iso-butanol have higher energy content and are capable of displacing more petroleum gasoline compared to the methanol-gasoline blend.

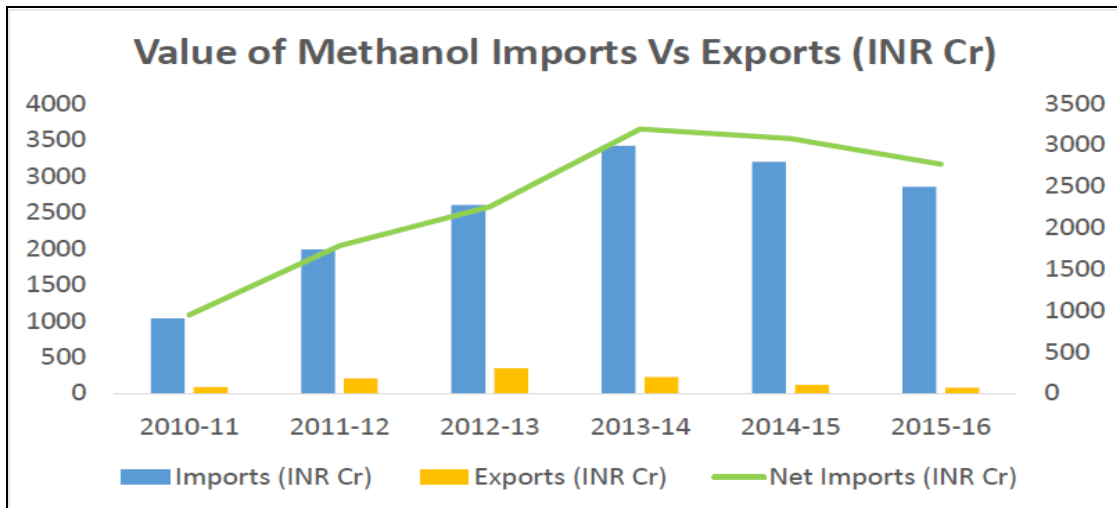
## 2. Methanol 15 (M15) In Petrol Reduces Pollution

Methanol is a neat burning drop in fuel which can replace both petrol & diesel in transportation & LPG, wood, kerosene. It is capable of replacing diesel in Railways, marine sector, generator sets, power generation and methanol based reformers may be the best compliment to electric and hybrid mobility. The economy obtained from methanol is a way to achieve the dream of complete hydrogen based fuel systems. Methanol burns efficiently in all internal combustion (IC) engines, produces no particulate matter, no soot, almost zero SO<sub>x</sub> and NO<sub>x</sub> emissions towards near nil pollution. The gaseous version of methanol – di methyl ether blended with Liquefied petroleum gas (LPG) can form an excellent alternative for diesel in giant trucks and buses. Methanol 15% (M15) in gasoline is capable of reducing pollution by 33% and more than 80% pollution can be reduced by sole replacement of diesel by methanol. The production of methanol can be done from Indian high ash coal, municipal solid waste, biomass, natural gas and stranded and flared gases. India can reach the target of producing methanol @ Rs.19 a liter through right technology from Indian coal and all other feedstocks. world is readily moving towards renewable methanol from CO<sub>2</sub> which is the best part and the perpetual recycling of steel plants emitted CO<sub>2</sub>, CO<sub>2</sub> into methanol, geothermal energy, effectively air to methanol.

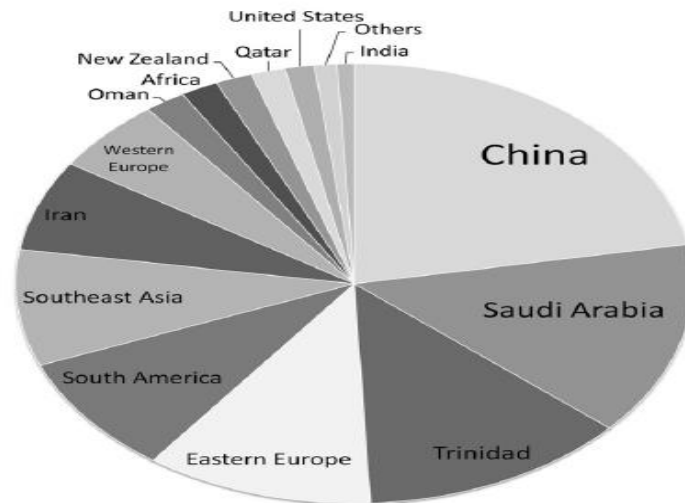
## 2.1 Price Of Production Of Methanol

Since, India is manufacturing all of its methanol from imported fossil fuels, it should use coal for methanol production that is anticipated to make it economically viable to produce methanol in India. India must set up a pilot plant for methanol production which would be followed by a commercial plant. As there is no commercial coal to methanol plant in India, it might be troublesome to calculate the precise cost of per unit methanol production, though; there have been pretty fair estimates of the same as Coal to methanol technology is a proven technology across the globe.

It is estimated that a 1600 tons per day of methanol plant will require a capital expenditure of ~INR 1200 Crores which would be able to produce methanol at INR 17-19 per liter which is comparable with the cost of imported methanol. Whereas, presently, the per liter cost of methanol production in India is INR 25-27 or even more depending on the volatility in the price of imported natural gas. Apart from using coal as a feedstock, biomass/municipal solid waste and flared natural gas can also be used for methanol production, but the continuous availability of latter would be a challenge. Therefore, coal seems to be a promising fuel for producing methanol in India. Since, Coal to methanol is a proven technology; India must tap its large coal reserves to produce methanol (and DME & Olefins) to use it as a substitute or drop-in fuel for gasoline and (diesel). Weak global coal prices and stricter environmental laws are likely to offer firm coal to methanol margins.



**Figure 1:** Worth of Methanol Imports Vs Exports (INR Cr)



**Figure 2:** Global Methanol Production

### 3. Conclusions

India is heading towards achieving 20% of its fuel demand to be covered by methanol by 2018. Brazil also assures that 20% of the fuel supply demand of gasoline could be covered with ethanol by 2020. It is remarkable that Brazil already utilized ethanol in different fuel blends since mid 70's. Renewable methanol by capturing carbon dioxide back from the atmosphere is turning into highly regarded and observed by the globe as the abiding solution to energy known to mankind. Methanol is a vital solution to the burning drawback of urbanly pollution worldwide.

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